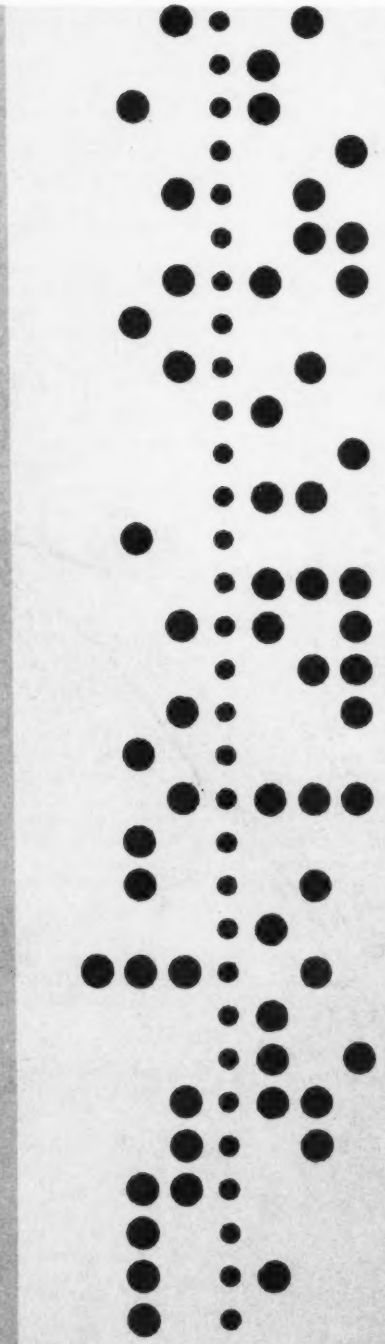
September 20, 1965

U.S. GOVERNMENT RESEARCH & DEVELOPMENT REPORTS



A Semi-monthly Abstract Journal for Science and Industry

CLEARINGHOUSE
FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION

U. S. DEPARTMENT OF COMMERCE / NATIONAL BUREAU OF STANDARDS / INSTITUTE FOR APPLIED TECHNOLOGY

September 20, 1965 / Volume 40, Number 18

U.S. Government

RESEARCH AND DEVELOPMENT REPORTS

Issued twice a month by the Clearinghouse for Federal Scientific and Technical Information. Annual subscription $15 ($3.75 additional for foreign mailing). Single copy $1. Make remittance payable to Superintendent of Documents and mail either to a U.S. Department of Commerce Field Office or to Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402. Address changes should be sent to Superintendent of Documents.

PURPOSE

U.S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS is published by the Clearinghouse for Federal Scientific and Technical Information to announce the availability of new reports of U.S. Government-sponsored R&D released by the Department of Defense and other Federal agencies. Included are reports from the Atomic Energy Commission and the National Aeronautics and Space Administration, which issue separate announcement journals as noted below.

FORMAT

USGRDR contains two sections with a combined table of contents. The first section, "Technical Abstract Bulletin" (TAB), announces reports released by the Defense Documentation Center (DDC) of the Department of Defense. The second section, "Other Research Reports and Related Material," announces reports released by civilian agencies and also includes certain older military reports. Reports are listed by accession/report number under 22 major subject category headings. Both sections contain abstracts and complete bibliographic citations and are followed by their respective indexes. Reports of current high industrial interest are featured in "Research Highlights."

HOW TO USE

Readers are urged to review all abstracts in their fields of interest, noting accession/report numbers and titles of reports to be ordered. Although primarily for retrieval, the descriptors provide a quick grasp of a report's scope. The reader is reminded that reports applicable to his field may be found under various subject category headings; the various indexes will aid in locating those reports. A single reference guide to new Government-sponsored technical literature, *Government-Wide Index to Federal Research and Development Reports*, is compiled monthly by the Clearinghouse from the combined indexes of this journal, *Nuclear Science Abstracts* (AEC), *Scientific and Technical Aerospace Reports* (NASA), and *Technical Abstract Bulletin* (DDC). This combined index is available from Superintendent of Documents, U.S. Government Printing Office, annual subscription $16, ($4.00 for foreign mailing) or $1.75 single copy.

TO ORDER REPORTS

All reports announced herein are available to the general public from the Clearinghouse, or in some cases from other sources as noted. To order Clearinghouse reports, use accession/report number (as given on the first line of each entry) and title from the Clearinghouse, U.S. Department of Commerce, Springfield, Va. 22151, or from any Commerce Field Office (listed on inside back cover). Prices for hard copy (HC) and microfiche copy (MF) are given for each entry. Prepayment is required unless purchases are to be charged to Clearinghouse deposit accounts. Order forms will be found in the back. Make check or money order payable to National Bureau of Standards—CFSTI.

OTHER JOURNALS

Reports of the National Aeronautics and Space Administration and the Atomic Energy Commission can be ordered from the Clearinghouse. They are abstracted in the following journals available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

NUCLEAR SCIENCE ABSTRACTS, Atomic Energy Commission, $30 a year domestic, $37 foreign, $1.75 single copy plus 25 percent foreign mailing.

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS. National Aeronautics and Space Administration, $33.00 a year domestic, $42.00 foreign, $2.50 single copy plus 25 cents foreign mailing.

U.S. DEPARTMENT OF COMMERCE
John T. Connor, Secretary

CLEARINGHOUSE FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION
Springfield, Va. 22151
Bernard M. Fry, Director

Contents may be printed freely. Mention of source will be appreciated. Use of funds for this publication approved by the Director of the Bureau of Budget, June 30, 1961.

RESEARCH highlights

Reports of current high industrial interest

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Chemicals

INDEXING X-RAY DIFFRACTION POWDER PATTERNS

(Order BNWL-22 Index: A Computer Program for Indexing X-Ray Diffraction Powder Patterns, HC $3.00/MF $0.75.)

Indexing x-ray diffraction powder patterns can be done so speedily by a computer program that several patterns may be run in a few minutes time. Until Battelle Northwest developed this program, and since W. L. Bragg's early experiments, the determination of the crystal class of substances by their diffraction patterns had been tedious work. This was especially true of the powder patterns of hexagonal, tetragonal, and orthorhombic crystals. Battelle calls its computer program INDEX. Written for an IBM 7090 with 32K memory, it operates under the control of the FORTRAN monitor system involving four subroutines.

Coatings

HIGH-QUALITY OPTICAL COATINGS OF ALUMINUM PRODUCED

(Order N65-22356 Electroforming Aluminum for Solar Energy Concentrators, HC $4.00/MF $1.00.)

Aluminum coatings with mirrorlike smoothness and reflecting properties can be plated on substrates using the aluminum electroforming process. General Electric researchers in a program sponsored by NASA scaled up the process to fabricate aluminum solar concentrators up to 7 inches in diameter with good optical properties. Hitherto this process was used only on a laboratory-experimental scale. The specimens produced show that a properly run bath yields deposits of excellent surface characteristics and that deposition stresses are almost completely absent. GE researchers conclude that the components fabricated with aluminum coating have

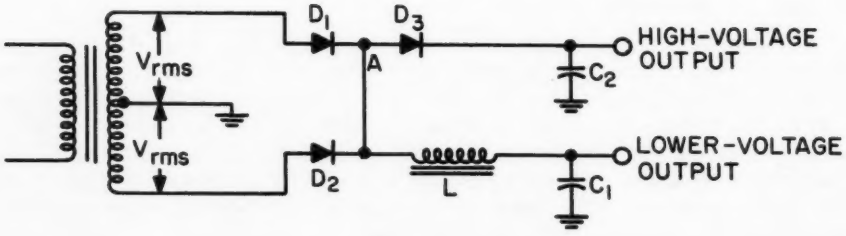
greater accuracy and quality than those produced by the conventional nickel electroforming or by any other currently known aqueous electroforming process. In this program, the researchers used an ethereal solution containing aluminum chloride and lithium hydride, originally developed by Couch and Brenner in 1952. The solution yields very satisfactory, thick, low-stress deposits that are smooth and strong. Initial evaluation of actual samples indicate that the physical properties of the deposits should meet stringent requirements. Deposition rate is about 1 mil/hr.

Electronics

MICROPOWER LOGIC CIRCUITS

(Order N65-23694 Micropower Logic Circuits, HC $0.75/MF $0.50.)

A number of digital logic circuits that have been developed primarily to fill a need for very low power logic systems in space vehicles can be advantageously adapted by industry. NASA technology utilization researchers report that with relatively simple engineering modifications, applications of these and ancillary circuits will be apparent for a variety of capital equipment and consumer products. These include automated production systems, numerically controlled machine tools, measuring instrumentation, remote controls and alarm systems, high-fidelity radio and recording systems, and television receivers.



The above circuit should find use in many industrial instruments as well as radio and television systems. For instance, it is commonly necessary to supply several different voltages to electronic equipment. These voltages may be obtained from separate power supplies or from voltage-regulating devices connected to one main supply. If voltage regulation is not required, the use of voltage regulators for supplying power adds additional complexity and expense. The circuit shown provides a simple solution. Diodes D_1 and D_2, choke L, and capacitor C_1 constitute a conventional choke input power supply. Choke input supplies have the characteristic of providing an output voltage that is somewhat less than the rms voltage appearing across one half of the transformer secondary. The voltage at point A is full-wave rectified and has a peak amplitude of nearly 1.4 V rms. Voltage drops across semiconductor diodes D_1 and D_3 are relatively negligible, so that high voltage at the output is very nearly 1.4 V rms. The output is full-wave rectified even though only two additional circuit elements (a diode and a capacitor) are used. This circuit is simple, does not use a special transformer, and its efficiency is high since no power is lost in voltage-dropping elements. The high-voltage output can approach 1.5 times the low-voltage output, and the ratio may be modified by proper choice of components.

Engineering and Construction

CONVENTIONAL BUILDINGS FOR REACTOR CONTAINMENT

(Order NAA-SR-10100 Conventional Buildings for Reactor Containment, HC only, $7.53.)

A construction guide for low-leakage structures to house nuclear reactors gives procedures patterned after methods common to the construction industry whenever possible. The guide discusses basic leakage mechanisms, experimental data for laboratory measurement of building components, and the testing of completed structures. Prepared for the AEC by Atomics International, the guide gives information on leakage characteristics of various conventional building components, materials, and completed structures. It includes methods for improving leakage characteristics, and typical uses of low-leakage conventional components for reactor containment planning, design, and construction.

Fuels

HIGH PRESSURE COMBUSTOR STUDIES

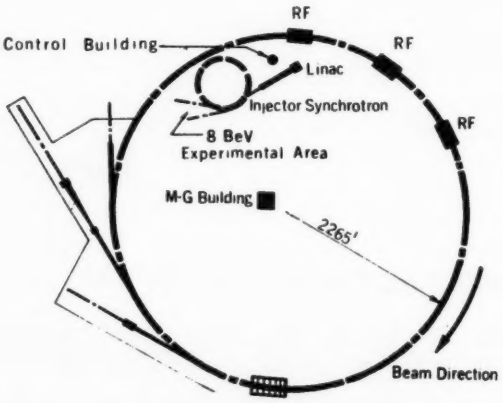
(Order AD-617 191 High Pressure Combustor Studies of Flame Radiation as Related to Hydrocarbon Structure, HC $4.00/MF $1.00.)

Combustor studies of flame radiation as related to hydrocarbon structure have been made by Phillips Petroleum on 25 fuels varying widely in molecular structure and boiling point, and a JP-5 group blended to rigidly control hydrocarbon type and aromatic structure. The Navy-sponsored tests used a 2-inch-diameter research combustor to simulate an aviation turbine engine. Basically the experiment was to determine the effect of combustor operating variables and fuel variables on flame radiation. Data were obtained at 16 different operating conditions consisting of all possible combinations of combustor pressure at 170 and 230 ft/sec (cold reference), and heat input at 170 and 230 Btu/lb of air. In general, flame radiation increased with increasing combustor pressure, inlet air temperature, and heat input rate. It decreased with increasing flow velocity. The magnitude of these effects, however, differed with both hydrocarbon structure and operating conditions. Flame emittance levels approaching black body were observed at severe conditions for combustion with fuels of low hydrocarbon content, and a satisfactory relationship was established between flame radiation and fuel hydrogen content for a given operating condition.

200 BEV PROTON ACCELERATOR DESIGN STUDY

(Order UCRL-16000 -- 200 BEV Accelerator Design Study, two-volume set, HC only, $10.25 a set. Or order UCRL-16000 -- 200 BEV Accelerator Design Study, Summary, HC only, $2.00.)

A 200 billion electron volt (BEV) proton accelerator has been designed by the Atomic Energy Commission's Lawrence Radiation Laboratory. The accelerator will be the biggest and most complex instrument for scientific research, and the Nation's leading physicists feel it will lead to a deeper understanding of the fundamental forces that govern the universe. The proposed new facility will cost about $300 million for the machine and buildings, laboratory space, shops, and offices. The annual budget of the laboratory, when fully operational about 11 years after authorization, will be about $60 million. The resident staff of scientists, engineers, and support groups will number above 2,000 at the time of full operation. The main component of the great accelerator is a mile-in-diameter slender ring composed of about 500 electromagnets spaced at intervals along the circle. Protons, the nuclei of hydrogen atoms, will be driven over this nuclear freeway approaching the speed of light, receiving a 3-1/2 million electron volt boost of energy on each revolution to reach an ultimate energy of 200 BEV. This is seven times greater than the present highest energy machine, the Alternating Gradient Synchrotron at AEC's Brookhaven National Laboratory. The proposed 200 BEV accelerator will be both a high energy and a high intensity machine. That is, the number of particles accelerated will be about 10 times more than the number available from present major machines. The magnets comprising the main accelerator ring, weighing about 20,000 tons, will be housed in a tunnel covered by 25 feet of earth to absorb radiation generated by the speeding particles. The installed power requirements for the accelerator and its experimental equipment will be about 150 megawatts at start-up and more than 200 megawatts several years later. AEC is presently studying sites which 46 States have submitted for consideration. The two-volume Lawrence Radiation Lab study contains complete preliminary design and detailed cost estimates.



Power Source Devices

REVIEW OF PORTABLE POWER GENERATORS

(Order N65-25272 Electrical Power Generation Systems for Space Applications, HC only $1.00.)

NASA and Department of Defense personnel have prepared a new review of portable electrical power generators. The document reviews the systems primarily for their use in space missions; however, since it gives the current state of development of the systems, it will be of interest and value to others who have an eye toward using the portable generators. The document covers nuclear, solar, and chemical devices. Nuclear types are reactor and isotope. Solar types include photovoltaic, thermoelectric, thermionic, and dynamic systems. Chemical power systems are engines, batteries, and fuel cells. Nuclear systems have the advantage of high power output, while solar systems have a free unlimited energy source (the sun) to power them. Chemical types such as engines and batteries have enjoyed long use and are unusually reliable.

Testing, Analysis

GAMMA-RAY SPECTRUM CATALOG

(Order IDO-16880 Scintillation Spectrometry Gamma-Ray Spectrum Catalog, Vols. 1 and 2, HC only, $10.00 a set.)

An updated gamma-ray spectrum catalog prepared for the Atomic Energy Commission contains data on the interaction of gamma rays with matter, the pulse-height spectrum, reactor environment and summation effects, and bremsstrahlung. It also gives quantitative analysis of scintillation gamma-ray spectra and computer techniques for data analysis. Compiled by Phillips Petroleum, the work is intended to summarize current state-of-the-art in experimental techniques developed for application of the scintillation spectrometer to quantitative gamma-ray spectrometry. Numerical tables of detector efficiency, photopeak efficiency, and other experimental variables are given in appendices. Graphs of gamma-ray spectra are included to permit the user to prepare reference libraries of spectra on perforated tape, punched cards, or magnetic tape for use with pulse analyzers equipped with digital read-in devices. Spectra in this form can be very useful in the interpretation of data by visual comparison and simple subtraction procedures using the arithmetic circuitry provided as a feature on many modern pulse-height analyzers.

CONTINUED PROGRESS FOR IRRADIATED WOOD-PLASTIC MATERIALS

(Order ORO-628 Preparation of Wood-Plastic Combinations Using Gamma Radiation to Induce Polymerization, HC $4.00/MF $0.75.)

Continued progress on the production of irradiated wood-plastic materials is reported by West Virginia University. Prepared for the AEC, the report discusses monomers that can be induced to polymerize, irradiation dose rate to bring about this reaction, treatment of additional species of both soft and hard woods, measurement of mechanical properties such as toughness and abrasion resistance, and the use of dyes to impart pleasing colors. Researchers continue to find that when the pores of wood are filled with a suitable liquid monomer which is then caused to polymerize by irradiation, a material results with improved properties. For example, such properties as toughness, hardness, bending strength, and compressive strength are greatly enhanced by the process. Additional improvements include a reduction in the rate of water absorption and the imparting of flame resistance. It was also found that tough continuous polymers and copolymers of vinyl chloride can be prepared if suitable plasticizers are used. In addition, copolymers of styrene-acrylonitrile appear to be feasible for use in wood-plastic composites. Through the use of carbon tetrachloride, important reductions in radiation requirements are possible. A number of polymer dyes can be used to accentuate the wood grain and impart attractive colors to the wood.

R & D REVIEWS

Available FREE from the Clearinghouse

Highlighted here are 4 recent issues in the series, A Review of Selected U.S. Government Research and Development Reports. They contain report resumes and bibliographies of special interest to industry.

SOLID FILM LUBRICATION (OTR-123)

Solid film or dry film lubrication is a rapidly advancing technology. Advantages over the conventional oil or grease lubrication are found in better performance at high and very low temperature and in high vacuum, or with exposure to nuclear and space radiation. Under some of these conditions solid film lubrication competes with the more exotic gas and liquid metal lubrication systems. Government R and D in this developing field has been concerned with bulk solids having either lamellar structure or soft low-friction properties as well as with solid films that are bonded by resins, ceramics, and metals. Each of the various materials and bond combinations have optimum environmental conditions dependent upon temperature, vacuum, radiation, exposure, loads, and service lifetime expectancy. These lubricants have found primary application in small arms or ground equipment, supersonic aircraft, and spacecraft. Government R and D, which is described in a review prepared by the NBS Institute for Applied Technology, has been devoted to planning programs, designing and building test equipment, and testing the various materials, environmental conditions, and service applications of these lubricants. Reports describing these efforts are listed in the review and are available from the Clearinghouse.

NONDESTRUCTIVE EVALUATION OF MATERIALS (OTR 124)

Government agencies have made important contributions in the field of nondestructive evaluation of materials. Carried out in-house and by competent researchers under contract, this work has included the use of Hall-effect devices, x-ray, infrared, gamma-ray, ultrasonic, electromagnetic, and liquid penetrant techniques. Materials worked with include metals, alloys, fiberglass, and ceramics. A review prepared under auspices of the NBS Institute for Applied Technology describes the efforts and lists the reports available on the subject from the Clearinghouse. One report, for example, points up the promising development of infrared detection methods for nondestructive analysis of metallic and ceramic structures. The technique, which examines heat flow from a heat source into the material under examination, detected voids, delamination (areas of unbonding), and inclusion inconsistencies in both ceramics and metals. Another report available describes the use of a Hall element to determine metal fatigue. This process involves monitoring perturbation in the magnetic field at the surface of a specimen that is magnetized.

MICROMINIATURIZATION OF CIRCUIT COMPONENTS (OTR-125)

Current research and development has placed great emphasis on microminiaturization of circuit components. Advantages of this technology because of possible size and cost reductions and reliability improvements are recognized and are being achieved as experience is gained. Development of manufacturing techniques and processes concurrently with component microminiaturization is underway. A broad industry production capability has been demonstrated in connection with the fabrication of most microelements for the micromodule production program. Many thousands of microcomponent types are now on the market and are being used in quantity throughout the industry. These include standard tolerance precision film and composition resistors; glass, ceramic, tantalum, mylar, and polystyrene capacitors; inductors; adjustable resistors, capacitors, and inductors; and all types of low power solid-state components. These are used in all-microcomponent circuits and for extending the capability of integrated microcircuits. Government research among other things has involved further reduction in the size of discrete conventional components by controlling the geometric pattern and packaging at the development stage. An additional advancement in Government R and D has been the fabrication of circuit components on a single substrate by controlled deposition of thin films of conducting, insulating, semiconducting, and ferromagnetic materials. Significant size reductions and a potential increase in reliability over conventional component techniques has been made possible in each approach. A review prepared by the NBS Institute for Applied Technology describes the Government effort during the past 5 years and lists the reports available from the Clearinghouse.

ORGANIC SEMICONDUCTORS (OTR-126)

A review of organic semiconductors prepared by the NBS Institute for Applied Technology discloses that Government research in this field is proceeding at a rapid pace stimulated by the remarkable progress achieved with silicon and germanium in the related inorganic field. Government research and development is aimed at expanding much further the scope of all semiconductor applications. As defined by Government researchers, organic semiconductors are those solids containing an appreciable number of carbon-carbon bonds and capable of supporting electronic conducting. Such solids are grouped into the following categories: molecular crystals, charge transfer complexes, and polymers. Examples of the molecular crystal group are naphthalene and the well-studied anthracene. The charge transfer complexes are associated with biological systems. Examples of the polymer group are the so-called pyropolymers with recent emphasis on conjugated structures. The semiconducting properties of the polymers are not so well established as those of the molecular crystals; however, the NBS review describes Government progress for all three types. Reports available on this subject from the Clearinghouse are also listed and described in the review.

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Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance (medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects. See also related fields: 02 Agriculture, 05 Behavioral and Social Sciences, and 07 Chemistry..... 34, S-13

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16 MISSILE TECHNOLOGY

Includes missile launching and ground support; missile trajectories; missile warheads and fuzes; and missiles. See also related fields: 01 Aeronautics, 17 Navigation, Communications, Detection, and Countermeasures, 19 Ordnance, 21 Propulsion and Fuels, and 22 Space Technology..... 124

17 NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

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20 PHYSICS

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TECHNICAL ABSTRACT BULLETIN

01. Aeronautics

AD-618 710 Div. 9/15, 4/4, 10/7
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., Philadelphia, Pa. Missile and Space Div.
HETEROGENEOUS COMBUSTION AND SUBLIMATION OF CONES, SPHERES AND WEDGES AT HYPERSONIC SPEEDS,
by Leon M. Gilbert and Sinclaire M. Scala. Jan 65, 48p Rept. no. R65SD1
Contracts AF04 694 474, AF04 694 389
Unclassified report

AIAA Paper No. 65-42 prepared for presentation at Aerospace Sciences Meeting (2nd), New York, N. Y. 25-27 Jan 65.

Descriptors: (*Graphite, Aerodynamic heating), (*Combustion, Graphite), (*Sublimation, Graphite), (*Boundary layer, Chemical reactions), Hypersonic flow, Conical bodies, Spheres, Wedges, Air, Dissociation, Oxygen, Nitrogen, Carbon compounds, Monoxides, Carbon dioxide, Cyanogen, Transport properties, Heat transfer, Friction, Enthalpy, Laminar flow.

In a previous study (AD-605 199), the aerothermochemical interactions between graphite and dissociated air were examined theoretically for the case of combustion and sublimation near the forward stagnation point of a blunt body. The methods and results of the previous study are extended here to obtain locally-similar solutions for the combustion and sublimation of graphite at an arbitrary body-station for cones, spheres, wedges and sphere-cone configurations. The boundary layer is treated as a multicomponent chemically reacting gas, including the following nine chemical species: O, O2, N, N2, CO, CO2, CN, C and C3. A separate diffusion equation is considered for each of the species, and the velocity, temperature and concentration profiles are determined throughout the viscous layer for the laminar high Reynolds number flow regime. The local mass transfer rate, the local heat transfer rate, and the local skin friction coefficient are calculated for the different geometries for a wide range of hypersonic environmental conditions, and then these are correlated in terms of stagnation enthalpy, local pressure, local velocity gradient, pressure gradient parameter, and surface temperature. (Author)

AD-618 954 Div. 9/6
CFSTI Prices: HC$1.00 MF$0.50

Lockheed Missiles and Space Co., Sunnyvale, Calif.
SELF-SIMILAR DEVELOPMENT OF INVISID HYPERSONIC FREE-JET FLOWS.
Technical rept.,
by F. S. Sherman. 23 May 63, 24p Rept. no. 6-90-63-61
Unclassified report

Report on Fluid Mechanics.

Descriptors: (*Hypersonic flow, Jets), Orifices, Vacuum, Pressure, Numerical analysis, Adiabatic gas flow, Nozzle gas flow, Axially symmetric flow.

The steady, inviscid, free expansion of a jet from a sonic orifice into a vacuum passes into an 'inertia-dominated' regime that has very nearly radial streamlines and self-similar flow-property profiles beginning not far from the orifice and extending outward to infinity. If there is a low but finite counter-pressure at infinity, the inertia-dominated flow field extends out to the shock system imposed by the counter-pressure. The possibility of radial, self-similar flow is deduced from a simple analysis, and the form of the self-similar density profile is deduced for gamma = 5/3, 7/5, and 9/7 by reference to numerical calculations by the method of characteristics. A simple analytic fitting formula is obtained which is numerically accurate in the hypersonic regions of the jet and provides a much more convenient description of this flow region than is given by the method of characteristics. Since the key assumption of the analysis is that the flow speed is very close to a constant adiabatic limit speed, the similarity seems to be limited to flows of perfect gases, or to real gases with frozen internal degrees of freedom. (Author)

AD-619 036 Div. 1/1
CFSTI Prices: HC$3.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
APPLICATION OF MULTIPLE FIXED COMPENSATORS TO ACHIEVE INVARIANT RESPONSE.
Master's thesis,
by Jordan L. Dorrity. Jun 65, 74p
Rept. no. GGC/EE/65-4
Unclassified report

Descriptors: (*Aerospace craft, Flight control systems), (*Flight control systems, Design), (*Adaptive control systems, Design), Gusts, Attenuation, Dynamics, Feasibility studies, Analog computers, Simulation, Pitch(Motion).

The report presents techniques for the design of a system which uses multiple fixed compensators to provide invariant aircraft response. The frequency response method of analysis is used and the criteria for choosing the number of compensators and switching time are given. Dynamic pressure is the only factor used to determine the flight conditions for switching. An application of the techniques to the X-15 pitch-rate loop proved them to be very realistic. The command response was very nearly the same for all flight conditions and the gust response was attenuated quickly. Switching transients were not found to be undesirable. (Author)

AD-619 048 Div. 1/9
CFSTI Prices: HC$4.00 MF$1.00

Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
THEORETICAL DETERMINATION OF ROTOR BLADE HARMONIC AIRLOADS.
Technical rept.,
by R. H. Miller. Aug 64, 121p
Rept. no. TR-107-2
Contract NOw62 0100d
Unclassified report

Descriptors: (*Rotary blades(Rotary wings), Aerodynamic loading), (*Aerodynamic loading, Rotary blades-

(Rotary wings)), Moment of inertia, Wake, Determination, Theory.

A helicopter rotor in forward flight is subjected to a complex system of loads, both aerodynamic and inertial in origin. Of particular interest are the oscillatory airloads occurring at harmonics of the rotor speed. These loads are the primary source of the blade stresses which establish the fatigue life of the structure and of the oscillatory hub loads which determine the fuselage vibration level. Unlike a sing, the trailing- and shed-vortex system of the blade generates a spiral wake which returns close to the blade under most normal flight conditions. This returning wake critically influences the downwash distribution over the rotor disc and is the primary source of the higher harmonic airloading. The higher harmonic components of the airloading arise primarily from the downwash perpendicular to the plane of the rotor disc generated by this wake. Their analytical determination, therefore, requires some means of computing the downwash, which takes into account the spiral wake geometry, and of determining the unsteady aerodynamic effects associated with the blade passage through this variable velocity field. A better definition of the aerodynamics of a rotor in forward flight will also help in the design of hub and blades for minimum drag at the higher speeds envisaged for the next generation of helicopters.

AD-619 057 Div. 9/6, 15/1
CFSTI Prices: HC$2.00 MF$0.50

New York Univ., N. Y.
A FINITE DIFFERENCES SOLUTION FOR AN INITIAL VALUE PROBLEM IN A COMPRESSIBLE LAMINAR BOUNDARY LAYER.
Interim technical rept.,
by Gdalia Kleinstein. May 65, 42p
Contract AF33 615 1516, Proj. 7064
ARL 65-107

Unclassified report

Descriptors: (*Boundary value problems, Numerical analysis), (*Compressible flow, Laminar boundary layer), (*Laminar flow, Boundary value problems), Programming(Computers), Difference equations, Transport properties, Diffusion, Heat transfer, Shear stresses.

A finite differences solution utilizing an explicit scheme is presented for an initial value problem in an inhomogeneous compressible laminary boundary layer. The method is to be employed in the determination of velocity, temperature, and concentration profiles in the boundary layer; and heat transfer and shear distributions on the wall. The program (written for an IBM 7094 computer) is designed to accomodate either constant or variable transport properties. Diffusion coefficients used correspond to a binary mixture and consequently applications to inhomogeneous cases are restricted to either an arbitrary binary mixture or to a multicomponent mixture the constituents of which have similar diffusion properties. (Author)

AD-619 075 Div. 1/3, 25/6
CFSTI Prices: HC$5.00 MF$1.00

Columbia Univ., New York. Inst. for the Study of Fatigue and Reliability.
FIRST SEMINAR ON FATIGUE AND FATIGUE DESIGN.
Technical rept.,
by A. M. Freudenthal, W. Weibull, and A. O. Payne.
Dec 63, 175p Rept. no. TR-2
Contract Nonr26691, Proj. NR064 470

Unclassified report

See also AD-611 414.

Descriptors: (*Symposia, Fatigue(Mechanics)), (*Fatigue(Mechanics), Aircraft), Fracture(Mechanics), Sheets, Reliability, Structures, Airframes, Welds, Pressure vessels, Stresses, Wings, Aluminum alloys, Steel, Life expectancy, Mathematical analysis, Loading-(Mechanics), Safety.

Contents: Fatigue mechanisms and fatigue damage accumulation, by A. M. Freudenthal; Fatigue crack propagation in sheet specimens, by W. Weibull; Fatigue design and reliability, by A. M. Freudenthal; Analysis of fatigue test results, by W. Weibull; Fatigue of structures, by A. O. Payne.

AD-619 084 Div. 9/6
CFSTI Prices: HC$5.00 MF$1.25

Purdue Research Foundation, Lafayette, Ind.
PREDICTION METHODS FOR TURBULENT INCOMPRESSIBLE FLOW IN CONICAL DIFFUSERS.
Technical rept.,
by Stanley C. Titcomb and Robert W. Fox.
Jul 65, 184p Rept. no. FMTR-65-2
Contract DA31 124AROD138, Projs. 200 1050 1B700, 4332
AROD 4332:2

Unclassified report

Descriptors: (*Diffusers, Gas flow), (*Gas flow, Mathematical prediction), Incompressible flow, Turbulence, Velocity, Thickness, Conical bodies, Boundary layer, Integral equations, Momentum, Axially symmetric flow, Friction.

The aim of the study is to provide a method which is capable of predicting the entire mean-velocity field in a conical diffuser when the inlet velocity field is turbulent, incompressible, and completely specified. The desired prediction method is divided into two phases. In the first phase, a method for predicting the growth of the displacement and momentum thicknesses is considered. For the known straight-walled conical configuration, the value of the displacement thickness is sufficient to specify the free-stream velocity at any point along the axis of the diffuser. Therefore, in the second phase, a method for predicting the velocity profile in the boundary layer using the integral parameters and the free-stream velocity is considered. Several prediction methods to forecast the growth of the integral parameters are proposed. The conical diffuser data from the literature is used as a means for evaluating the applicability of the proposed methods. (Author)

AD-619 098 Div. 9/6
CFSTI Prices: HC$2.00 MF$0.50

Polytechnic Inst. of Brooklyn. Dept. of Aerospace Engineering and Applied Mechanics.
ON THE SOLUTION OF INITIAL-VALUED BOUNDARY LAYER FLOWS,
by Martin H. Steiger and Paavo Sepri. May 65,
26p Rept. no. PIBAL-872
Grant AF AFOSR1 63
AFOSR 65-1415

Unclassified report

Descriptors: (*Boundary layer, Boundary value problems), (*Boundary value problems, Boundary layer), Partial differential equations, Velocity, Wake, Two-dimensional flow.

This report is concerned with the exact solution of the boundary layer equations, particularly when the initial conditions are not of a simple form. A comparatively new procedure is applied to the forementioned problem, and the preliminary results of the investigation are reported here. The theory is restricted to flows

which are described by two coordinates. By replacing the normal partial derivatives by finite differences the boundary layer equations are reduced to an initial value system of coupled first order ordinary differential equations. Since these equations are classified as 'stiff', their solution requires special consideration. As an illustration, the velocity field of a two-dimensional wake is calculated, and the results are shown to be in good agreement with the solution obtained by full finite difference schemes. An improved theory is suggested and possible future studies are discussed. (Author)

AD-619 142 Div. 9/1

Princeton Univ., N. J. Gas Dynamics Lab.
STUDIES OF WAKES OF SUPPORT-FREE SPHERES AT M = 16 IN HELIUM,
by Irwin E. Vas, Earll M. Murman, and Seymour M. Bogdonoff. 1964, 8p
Contracts Nonr185837, AF33 615 1079
Unclassified report

Pub. in AIAA Journal v3 n7 p1237-44 Jul 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Spheres, Wake), (*Hypersonic characteristics, Spheres), Helium, Reynolds number, Turbulence, Taminar flow, Anemometers, Axially symmetric flow, Blunt bodies, Slender bodies.

A detailed investigation of the flow field behind spheres magnetically suspended in a Mach 16 helium stream was initiated. Pitot pressure and constant-current hot-wire measurements were employed to investigate a region from 1 to 50 body diameters downstream of two sphere diameters, 0.75 and 0.375 in., and several body Reynolds numbers from 45,000 to 109,000. Previous data reported in the literature indicated that transition to turbulence should occur within the region of investigation, but hot-wire voltage measurements lead to the conclusion that the wake is probably laminar. Detailed radial and axial pitot pressure distributions are presented and compared with two-dimensional cylinder data at the same Mach number, ballistic-range data, and two theories. The measured rms hot-wire fluctuation voltage was constant at a very low value along the wake axis but showed peaks at the wake edge. (Author)

AD-619 153 Div. 1/9, 9/7
CFSTI Prices: HC$7.75 MF$2.25

Lockheed-California Co., Burbank, Calif.
EFFECT OF MACH NUMBER, REYNOLDS NUMBER, AND THICKNESS RATIO ON THE AERODYNAMIC CHARACTERISTICS OF NACA 63A-SERIES AIRFOIL SECTIONS.
Final rept.,
by Oscar E. Sipe, Jr. and Norman B. Gorenberg.
Jun 65, 471p Rept. no. LR-18596
Contract DA44 177AMC144T, Task 1P125901A14203
USAAML TR-65-28
Unclassified report

Descriptors: (*Rotor blades(Rotary wings), Aerodynamic characteristics), (*Helicopter rotors, Subsonic characteristics), Wind tunnel models, Correlation techniques, Two-dimensional flow, Airfoils, Model tests, Thickness, Angle of attack, Transonic flow, Reynolds number, Graphics.

Force and moment data are presented from wind tunnel tests of two-dimensional symmetrical NACA 63A-Series airfoils of thickness ratios from 9 to 18 percent. The tests were conducted at Mach numbers ranging from M = .30 to M = .94 with Reynolds numbers varying from R = 2.0 X 1,000,000 to R = 9.5 X 1,000,000 and at angles of attack as high as 29 degrees. Comparisons are made, wherever possible, with NACA tests of the same or similar airfoils. The transonic similarity rule is used to evaluate the consistency of the data. (Author)

AD-619 156 Div. 1/3, 26/6
CFSTI Prices: HC$4.00 MF$1.00

Virginia Univ., Charlottesville. Research Labs. for the Engineering Sciences.
AN INVESTIGATION OF THE BEHAVIOR OF FLOATING RING DAMPERS AND THE DYNAMICS OF HYPERCRITICAL SHAFTS ON FLEXIBLE SUPPORTS.
Final rept. for 1 Jul 63-15 Sep 64,
by J. A. Friedericy, R. T. Eppink, Y. N. Liu, and A. Cetiner. Jun 65, 131p
Rept. no. UVA-CE-3340-104-65U
Grant DA AMC44 177 63G10, Task 1P125901A01403
USAAML TR-65-34
Unclassified report

Descriptors: (*Drive shafts, Dynamics), (*Helicopter rotors, Drive shafts), Damping, Vibration, Transmissions, Supports, Optimization.

This report deals with the development of two different analyses for the vibration responses in supercritical shafts: one especially suited for the determination of support impedances (mass, spring, damping coefficients) for minimum vibration response in the criticals; the other for direct vibration response in terms of statically measured shaft defects. The traveling wave concept is extensively discussed. Presented is a preliminary parameter study of the simply supported rotating shaft with one flexible intermediate support subjected to a half sine wave defects distribution. The effects of end masses are studied also. Several conceptual designs of multiring damping assemblies which can accommodate the damping requirements of hypercritical shafts are included in the report. (Author)

AD-619 157 Div. 1/9, 9/7
CFSTI Prices: HC$3.00 MF$0.75

Bell Helicopter Co., Fort Worth, Tex.
WIND TUNNEL TESTS OF A FULL-SCALE ROTOR AT HIGH SPEEDS.
Final rept.
by C. L. Livingston. Jul 65, 74p
Rept. no. Bell-556-099-002
Contract DA44 177AMC42T
Task 1P121401A14184
USAAVLABS TR-65-42
Unclassified report

Descriptors: (*Rotor blades(Rotary wings), Tests), (*Helicopter rotors, Performance(Engineering)), Wind tunnels, Airfoils, Lift, Drag, Design, Compressive properties, Angle of attack.

This report summarizes the results of a wind tunnel program conducted to define the effects of compressibility and advance ratio on the performance of a 46-foot-diameter, three-bladed rotor. Measured rotor profile power increase with lift coefficient and advance ratio were greater than predicted. Airfoil characteristics were synthesized that improve correlation of Mach number and lift effects on profile power. Preliminary radial flow considerations are presented and discussed. Additional analytical and experimental work is recommended to investigate in more detail the effects of advance ratio on profile power. (Author)

AD-619 282 Div. 33/1, 13/4, 27/2
CFSTI Prices: HC$3.00 MF$0.75

Federal Aviation Agency, Washington, D. C.
PRESENTATIONS AT NATIONAL AIRCRAFT NOISE SYMPOSIUM, SPONSORED BY THE FEDERAL AVIATION AGENCY AT THE INTERNATIONAL HOTEL, JOHN F. KENNEDY INTERNATIONAL AIRPORT, JAMAICA, NEW YORK, JUNE 9, 1965.
1965, 92p

Unclassified report

Descriptors: (*Airplane noise, Symposia), (*Airplane engine noise, Urban areas), Airports, Flight paths, Urban planning, Jet engine noise, Supersonic planes, Air pollution, Odors, Air transportation, Costs, United States Government.

The efforts of industry and government in seeking a solution to the problem of aircraft noise in urban areas are discussed. It is suggested that the aviation community and the communities surrounding great metropolitan airports join hands in taking responsible and effective action in dealing with the problem.

AD-619 285 Div. 1/9
CFSTI Prices: HC$3.00 MF$0.75

Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
PROGRAMS FOR MACHINE COMPUTATION OF ROTOR BLADE DOWNWASH.
Technical rept.,
by Nancy Ghareeb. Aug 64, 88p
Rept. no. TR-107-1
Contract NOw62 0100d

Unclassified report

Descriptors: (*Rotor blades(Rotary wings), Downwash), (*Programming(Computers), Downwash), (*Wake, Downwash), Integration, Harmonic analysis, Programming languages, Aerodynamic loading.

Programs are given for the computation of downwash due to trailing wake and shed wake, original straight line approximation to wake, and rotor load analysis.

AD-619 294 Div. 1/9
CFSTI Prices: HC$4.00 MF$0.75

TRW, Inc., Cleveland, Ohio. TRW Accessories Div.
PARAMETRIC STUDY ON THE ROLLER GEAR REDUCTION DRIVE.
Final rept. phase no. 1,
by A. L. Nasvytis and J. E. Bauer. Jun 65, 115p
Rept. no. TRW-ER-5637
Contract DA44 177AMC30T, Task 1D121401D14414
USAAVLABS TR-64-29

Unclassified report

Descriptors: (*Helicopters, Transmission gears), (*Reduction gears, Helicopters), Drives, Weight, Effectiveness, Roller bearings, Performance(Engineering), Turbines.

This report covers the parametric study of the roller gear drive to determine its applicability to current or projected Army helicopters. The basic principles used in the roller gear drive are presented. The results of a study to determine the weight, volume, and outside diameter as a function of ratio (from 20:1 to 100:1) and horsepower (from 250 to 4,000) are included. Other features, such as reliability, efficiency, life, vibrations, and cost are discussed.

AD-619 324 Div. 9/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
GENERALIZED ANALOGY BETWEEN THE MASS-TRANSFER COEFFICIENTS IN A MULTICOMPONENT BOUNDARY LAYER WITH AN ARBITRARY PRESSURE GRADIENT,
by B. I. Reznikov and G. A. Tirskii. 4 Aug 65, 12p
Rept. no. FTD-TT-65-543
TT 65-62929

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady, v158 n4 p798-801 1964.

Descriptors: (*Boundary layer, Transport properties), (*Transport properties, Boundary layer), Pressure, USSR, Enthalpy, Diffusion, Heat transfer, Differential equations.

AD-619 396 Div. 9/6
CFSTI Prices: HC$4.00 MF$1.00

Space and Information Systems Div., North American Aviation, Inc., Downey, Calif.
UNSTEADY AERODYNAMICS FOR ADVANCED CONFIGURATIONS. PART IV. APPLICATION OF THE SUPERSONIC MACH BOX METHOD TO INTERSECTING PLANAR LIFTING SURFACES.
Final rept. for 1 Apr 63-15 Nov 64,
by Michael T. Moore and Lowell V. Andrew.
May 65, 141p Rept. no. SID-64-152-4
Contract AF33 657 10399, Proj. 1370, Task 137003
FDL TDR-64-152 P4

Unclassified report

See also AD-618 096.

Descriptors: (*Aerodynamic loading, Aerodynamic configurations), (*Supersonic characteristics, Aerodynamic configurations), Airfoils, Lift, Numerical analysis, Programming(Computers), Potential theory, Diaphragms-(Mechanics).

Ashley's approach to mutual interference theory by source superposition methods has been applied to the prediction of supersonic air loads on intersecting thin lifting surfaces in steady of oscillatory motion. Steady loading is regarded as the special case of zero frequency of oscillation. Each surface may be oscillating in a mode of rigid or elastic vibration or linear combinations thereof. Evvard's diaphragm concept has been extended to treat the out-of-plane interference problem. As a result, any leading or side edge on any of the intersecting surfaces may be subsonic. The study reported herein has lead to the formulation of a method by which diaphragm regions can be selected that eliminate the need for calculating out-of-plane velocity potentials. Based on mutual interference theory, the method requires only the calculation of out-of-plane velocities so that tangential flow conditions may be met. The Mach-box method has been used to obtain an approximate solution to the problem. In following the aerodynamic influence coefficient procedure of Zartarian and Hsu, each surface and diaphragm is overlaid with a grid of rectangular Mach boxes, the diagonals of which are parallel to the Mach lines. (Author)

AD-619 397 Div. 9/6, 9/7
CFSTI Prices: HC$2.00 MF$0.50

Space and Information Systems Div., North American Aviation, Inc., Downey, Calif.
UNSTEADY AERODYNAMICS FOR ADVANCED CON-

FIGURATIONS. PART V. UNSTEADY POTENTIAL FLOW AROUND SLENDER BODIES AT ANGLES OF ATTACK.
Final rept. for 1 Apr 63-Sep 64,
by T. C. Li. May 65, 50p
Rept. no. SID-64-1512-5
Contract AF33 657 10399, Proj. 1370, Task 137003
FDL TDR-64-152 P5 Unclassified report
See also AD-619 396.

Descriptors: (*Aerodynamic loading, Aerodynamic configurations), (*Fluid flow, Slender bodies), (*Potential theory, Fluid flow), Angle of attack, Boundary value problems.

In the portion of the study covered in this report, linearized theory is developed for potential flow around a slender body at not too large angles of attack. The solution is obtained by 'definitizing' the flow equation and rigorously satisfying the boundary conditions. This approach is completely different from conventional methods in that it constitutes a process of obtaining an analytic solution to the problem of potential flow by a 'march from the body' toward infinity. The extension of this new theory to the nonlinear case is immediate. Having shown it is possible to not restrict the Mach number, it is expected that the new theory should be applicable to the cases of subsonic, transonic and supersonic speeds as well. (Author)

02. Agriculture

AD-618 861 Div. 16/14, 16/2, 16/11
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
TREATMENT OF PASTEURELLOSIS-AFFECTED CALVES WITH ANTIBIOTICS,
by N. I. Anpilov. Jun 65, 4p Translation-1418
TT 65-62795 Unclassified report
Trans. of Veterinariya (USSR) v40 n12 p54-5 1963.

Descriptors: (*Pasteurella, Bovines), (*Bovines, Antibiotics), (*Antibiotics, Veterinary medicine), Diseases, Therapy, Tetracyclines, Oxytetracycline, Dosage, USSR.

AD-619 339 Div. 16/14
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
PATHOMORPHOLOGICAL AND PATHOGENIC CHARACTERISTICS OF VIRAL GASTROENTERITIS OF SWINE,
by F. M. Ponomarenko and A. I. Yatsyshin.
Jun 65, 5p Translation-1400

TT 65-62945 Unclassified report

Trans. of Veterinariya (USSR) v38 n8 p39-40 1961.

Descriptors: (*Gastrointestinal system, Virus diseases), (*Swine, Gastrointestinal system), (*Virus diseases, Swine), Pathology, Morphology(Biology), Necrosis, Membranes(Biology), Mucus, Cells(Biology), Diarrhea, Communicable diseases, Veterinary medicine, USSR.

Conclusions: A disease of pigs, observed on a number of farms in the Ukraine, based on pathomorphological features, should be classified as acute desquamative-catarrhal gastroenteritis, often accompanied by superficial necrosis of the mucous membranes of the stomach and intestines. In contrast to gastroenteritis in pigs of another nature, a pathogenic peculiarity of this disease is that along with it, sharp functional changes on the part of the stomach and intestines are not accompanied by significantly expressed morphological changes of the mucous membranes, if the disease is not complicated by secondary infections. Judging by the pathomorphological changes in the stomach and intestines, the virus is apparently epithelialtropic. The sharp desquamation of the intestinal epithelium may explain the great contagiousness, since during profuse diarrhea a considerable dissemination takes place of the cells of the intestinal epithelim containing the causative agent of the disease into the surrounding medium. (Author)

03. Astronomy and Astrophysics

AD-618 699 Div. 2/1, 25/7
CFSTI Prices: HC$3.00 MF$0.75

Ohio State Univ., Columbus.
VARIATIONS IN THE SPECTRUM OF 56 ARIETIS.
Master's thesis,
by William Arthur Wallace. 1965, 76p
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Variable stars, Line spectrum), (*Line spectrum, Intensity), Helium, Silicon, Hydrogen, Astrophysics.

The question of whether or not the variations in intensity of spectrum variables are strictly periodic and stable over long periods of time is discussed. 56 Arietis affords one test of this question because of its exceptionally short period of variation and the availability of previous data. An attempt was made to investigate the intensity variation of the He I liner and the Si II lines. The strengths of H epsilon and H gamma were investigated in order to ascertain if short period fluctuations in equivalent width of an angstrom or more occur in 56 Arietis.

AD-618 761 Div. 2/1, 25/5

Harvard Coll. Observatory, Cambridge, Mass.
LOCAL IRREGULARITIES IN AN EXPANDING UNIVERSE,
by William M. Irvine. 18 Sep 64, 27p
Unclassified report

Pub. in Annals of Physics v32 n2 p322-47 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Relativity theory, Astronomy), (*Gravity, Galaxies), (*Astronomy, Galaxies), Mechanics, Motion, Celestial mechanics, Perturbation theory, Time.

Einstein's theory of gravitation is here applied to a model of the universe in which local irregularities in the space-time metric are superimposed on the values appropriate to a uniform, isotropic universe. The mass tensor is taken to be that of a perfect fluid. The mass density is considered to fluctuate about a mean D, the density in the uniform model, but the fluctuations need not be small with respect to D. The effect of pressure is included. The system of simultaneous equations derived by Lanczos in 1925, which relates the irregularities in the metric to the irregularities in the mass tensor, is shown to simplify under conditions of astronomical interest. The equation of motion for the irregularities is derived in comoving coordinates. The relation of the local inertial coordinate system to the comoving system is examined. The equation of motion in the inertial system is derived. Its validity is not restricted to small pressures. The inclusion of steady-state cosmology within general relativity appears to lead to inadmissible results when local irregularities are present.

AD-618 798 Div. 2/1, 2/5

Space Sciences Lab., Univ. of California, Berkeley.
THE VARIATION OF LUNAR RADIO EMISSION DURING AN ECLIPSE,
by W. J. Welch, D. D. Thornton, and S. Winter.
19 Mar 65, 6p
Contract Nonr22254; Grant NSF G16741
Unclassified report

Pub. in Journal of Geophysical Research v70 n12 p2793-8 Jun 15 1965 (Copies not available to DDC or Clearinghouse customers). Revision of manuscript submitted 19 Oct 64.

Descriptors: (*Moon, Thermal radiation), (*Lunar eclipses, Radio signals), (*Surface temperatures, Moon), Surface properties, Soils, Thermal conductivity, Density, Specific heat, Lunar environment, Extraterrestrial radio waves, Attenuation.

The eclipse of the moon on December 31, 1963, was observed at a wavelength of 8.35 mm. A decrease in the brightness temperature at the center of the disk of 3.5K was measured. From this result, a value of 0.0002 for the combination sq. root a(K/pc) is deduced for a homogeneous lunar subsoil. a is the power attenuation coefficient for radio waves in the subsoil; K, p, and c are, respectively, the thermal conductivity, density, and specific heat capacity of the subsoil in cgs units. (Author)

AD-618 832 Div. 2/1

National Research Council of Canada, Ottawa (Ontario).
RADIO OBSERVATIONS OF H II REGIONS,
by L. A. Higgs and E. G. Thibodeau. 1964, 4p
Rept. no. NRC-8494
Unclassified report

Pub. in The Observatory v85 n944 p46-9 Feb 1965
(Copies available only to DDC users).

Descriptors: (*Interstellar matter, Radio astronomy), (*Hydrogen, Microwave spectroscopy), Ionization, Mathematical models.

AD-618 905 Div. 2/1, 20/6, 12/6
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., Philadelphia, Pa. Missile and Space Div.
SOLAR FLARE HAZARDS: PREDICTABILITY,
by R. C. Good, Jr. Jul 65, 45p Rept. no. R65SD31
Unclassified report

Descriptors: (*Astrophysics, Solar flares), (*Solar flares, Mathematical prediction), Manned spacecraft, Space flight, Hazards, Protons, Sunspots, Cosmic rays, X rays, Space environmental conditions, Health physics.

The hazards of solar flares are discussed in some detail to show the need for prediction. Hazards are noted as protons, X rays, ultraviolet, and radio interference. Since the first is potentially the most dangerous, some data on dosage during flares is presented to evaluate the hazards. Since flares occur at or near sunspots and since there seems to be a direct correlation with the characteristics of sunspots, some discussion is given of the dimensions and characteristics of sunspots. One prediction scheme is presented which involves the statistics of flares, and a scheme is described that is presently being used for flare studies at the Space Sciences Laboratory. (Author)

AD-618 910 Div. 2/1, 15/1
CFSTI Prices: HC$3.00 MF$0.75

Liege Univ., Cointe-Sclessin Belgium). Institut

d'Astrophysique.
ON THE APPLICATION OF CURTIS-GODSON'S APPROXIMATION TO THE 9.6 u BAND OF ATMOSPHERIC OZONE.
Technical note,
by M. Mayot and E. Vigroux. 31 Jan 65, 56p
Rept. no. TN-1
Contract AF61 052 685
AFCRL 65-265

Unclassified report

Descriptors: (*Ozone, Atmosphere), (*Numerical analysis, Band spectrum), (*Absorption spectrum, Ozone), Infrared spectroscopy, Astrophysics, Belgium.

Critical study of the Curtis-Godson's approximation, applied to the present interpretation of the observations of the atmospheric ozone in infra-red. Computations of the corrections to be brought to account for the different conditions in laboratory experiments and observations through the atmosphere. Comparison between theoretical results and observational data. Factual conclusions. (Author)

AD-618 986 Div. 2/1, 20/2

California Inst. of Tech., Pasadena.
NEUTRINO PROCESSES AND PAIR FORMATION IN MASSIVE STARS AND SUPERNOVAE,
by William A. Fowler and F. Hoyle. 8 Apr 64, 114p

Unclassified report

Pub. in The Astrophysical Journal supl. series supl 91 v9 p201-320 Dec 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Stars, Nuclear reactions), (*Supernovae, Nuclear reactions), (*Nuclear reactions, Stars), (*Neutrinos, Stars), Astrophysics, Pair production, Thermonuclear reactions.

The paper traces the physical properties of matter inside highly evolved stars, on the assumption that the whole material of the star is non-degenerate and that the star is in quasi-hydrostatic equilibrium. When these conditions are satisfied, the physical evolution of a particular element of material is insensitive to the stellar model but not to the total mass of the star. Our considerations refer explicity to stars of mass greater than approx. 10 micro sun but less than 1,000,000 micro sun, at which point general relativistic considerations become paramount. In Parts I and II neutrino-loss processes and neutrino-loss rates are examined. In Part III a method is developed for calculating the product mu beta as a function of temperature when electron positron pair formation is taken into account. In this product mu is the mean molecular weight and beta the ratio of gas pressure to gas plus radiation pressure. In Part IV the internal energy of matter is considered again as a function of temperature, and including the effects of pair formation. Parts V, VI, and VII are concerned with nuclear reactions, in particular with oxygen burning, the alpha-process, and the e-process. In the final Parts VIII and IX the onset of a supernova of Type II is considered in which the central core implodes while the mantle and envelope of the star explode. These considerations are tentative because the discussion now involves the structure of the whole star, and hence of the stellar model. It is emphasized that massive stard do not necessarily become Type II supernovae but can collapse to general relativistic singularities.

AD-619 032 Div. 2/1, 25/4
CFSTI Prices: HC$4.00 MF$1.00

General Electric Co., Philadelphia, Pa. Missile and Space Div.
A STUDY OF THE REFLECTION AND POLARIZATION CHARACTERISTICS OF SELECTED NATURAL AND ARTIFICIAL SURFACES,
by K. C. Coulson, E. L. Gray, and G. M. Bouricius.
May 65, 150p Rept. no. R65SD4
Contract N123 60530 51172A

Unclassified report

Descriptors: (*Planets, Surfaces), (*Optical properties, Surfaces), (*Albedo(Astronomy), Planets), Reflection, Polarization, Light transmission, Planetary atmospheres, Moon, Soils, Sand, Grasses, Concrete, Paulins, Asphalt, Gravel, Pavements.

Two aspects of the short wave regime of planetary radiation are considered. Extensive measurements of the reflection properties of a number of surfaces have been made, both the directional reflectance and the degree of polarization of the reflected radiation having been determined. Most surfaces show pronounced 'limb-brightening' for large angles of incidence, while for small angles of incidence the reflectance does not vary greatly with angle at which the surface is viewed. The degree of polarization shows a characteristic pattern for most surfaces, a maximum being located in the principal plane at 100 to 120 degrees from the antisource direction and a small region of negative polarization being observed in the vicinity of the antisource direction. For most surfaces the reflectance increases and the maximum degree of polarization decreases with increasing wavelength. The reflectance values are introduced into the theory of radiative transfer to determine the characteristics of the radiation field at high altitudes above the surface. For the cases of clear and slightly turbid atmospheres the surface properties have a strong influence on the contrasts which would be observed from a high altitude vantage point. A possibility of using polarization characteristics to enhance contrasts is demonstrated. (Author)

AD-619 113 Div. 2/1

Chicago Univ., Ill.
ON THE PRINCIPLE OF THE EXCHANGE OF STABILITIES. I. THE ROCHE ELLIPSOIDS,
by N. R. Lebovitz. 31 Aug 63, 6p
Grant AF AFOSR62 136
AFOSR 65-1003

Unclassified report

Pub. in Astrophysical Journal v138 n4 p1214-7 Nov 15 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Ellipsoids, Stability), (*Stability, Ellipsoids), Perturbation theory, Celestial mechanics.

The principle of the exchange of stabilities is discussed in the context of the Roche ellipsoids. It is shown that the vanishing of a characteristic frequency at a point along the Roche series does not imply an exchange of stabilities at that point. (Author)

AD-619 133 Div. 2/1, 25/7

Palomar Observatory, Pasadena, Calif.
A SEARCH FOR INTERSTELLAR ICE ABSORPTION IN THE INFRARED SPECTRUM OF MU CEPHEI,
by R. E. Danielson, N. J. Woolf and J. E. Gaustad.
21 Aug 64, 13p
Contract AF49 638 1323, Proj. 9774, Task 977401
AFOSR 65-1080

Unclassified report

Prepared in cooperation with Princeton Univ., N. J. Observatory; Carnegie Institution of Washington, D. C.; and California Inst. of Tech.,

Pasadena.
Pub. in the Astrophysical Journal v141 n1 p116-125 1 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Stars, Absorption spectrum), (*Interstellar matter, Ice), (*Infrared radiation, Absorption), Spectra-(Infrared), Molecular spectroscopy.

The infrared spectra of mu Cephei and alpha Orionis obtained in the second flight of Stratoscope II are compared in an attempt to detect an absorption band at 3.1 microns due to interstellar ice particles. The absence of the band suggests that no more than one-quarter of the interstellar reddening is due to ice. The water-vapor bands in the spectra of these two supergiants are surprisingly strong, and no satisfactory explanation for this phenomenon is known. (Author)

AD-619 159 Div. 2/1
CFSTI Prices: HC$1.00 MF$0.50

Sacremento Peak Observatory, Sunspot, N. Mex.
THE SPECTROPHOTOMETRY OF LINES IN GRAINS OF CONTINUOUS EMISSION,
by A. B. Severny and V. L. Khokhlova. 1963, 11p
Solar Research Note no. T-11
TT 65-62847; AD 413 047 superseded
Unclassified report

Trans. of Akademiia Nauk SSSR. Krymskaya Astrofizicheskay Observatoriya. Izvestiya v21 p190-7 1959.

Descriptors: (*Solar disturbances, Line spectrum), (*Line spectrum, Solar spectrum), Spectrophotometers, Intensity, Ions, Atoms, USSR.

A spectrophotometric reduction of lines of neutral elements and some ions in the spectrum of grains of continuous emission was carried out. No noticeable difference between the behaviour of the neutral atoms and ions in the spectrum of the grain was noted. It is shown that the difference between the lines of the grain spectrum and those in the spectrum of undisturbed regions is explained satisfactorily when assuming the grains being optically thin formations localized at optical depths (in frequencies of the continuous spectrum) from grain number = 0 to approximately = 1. It is shown that the results of investigations of faculae cannot be explained by the averaging of the effect observed in the grains of continuous emission. (Author)

AD-619 205 Div. 2/1
CFSTI Prices: HC$4.00 MF$1.00

Brandeis Univ., Waltham, Mass. Astrophysics Inst.
A COMPUTER MODEL FOR PLANETARY NEBULAE.
Scientific rept.,
by Murray Turoff. Feb 65, 125p Rept. no. SR-1
Contract AF19 628 4019, Proj. 8647, Task 864701
AFCRL 65-223
Unclassified report

Descriptors: (*Nebulae, Mathematical models), (*Astrophysics, Nebulae), Planetary atmospheres, Physical properties, Astronomical data, Programming-(Computers).

A treatment of the planetary nebulae problem in which a computer model is constructed that will produce a consistent solution for such variables, within the nebular shell, as the radiation field, electron temperature, ionization densities, and expansion velocities of the elements. The nebula is characterized by such parameters as the average density of particle, average expansion velocity, size, relative abundances, and temperature of the central star. An equal measure of treatment is provided the three physical problem areas associated with planetary nebulae: radiative transfer, gas dynamics, and gas structure. The problem is treated in as much detail and accuracy as is consistent with both available computers and inherent observational inaccuracies. (Author)

AD-619 231 Div. 2/1, 9/1

Chicago Univ., Ill.
THE EQUILIBRIUM AND THE STABILITY OF THE DEDEKIND ELLIPSOIDS.
Technical rept.,
by S. Chandrasekhar. 6 Nov 64, 14p
Contract Nonr212124
Unclassified report

Pub. in The Astrophysical Journal v141 n3 p1043-55 1 Apr 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Stability, Ellipsoids), (*Ellipsoids, Equations of state), Sequences, Fluid mechanics, Harmonic analysis.

Figures of equillibrium of liquid masses with internal motions of uniform vorticity define the Dedekind sequence. It has been known for a long time that the Dedekind sequence of stationary ellipsoids is congruent to the Jacobian sequence of uniformly rotating ellipsoids. It is shown in this paper that the characteristic frequencies of oscillation of a Dedekind ellipsoid, belonging to the second harmonics, are identical with those of a Jacobi ellipsoid having the same figure; but that the points at which instability sets in by a mode of oscillation belonging to the third harmonics are different along the two sequences. (Author)

AD-619 263 Div. 2/1
CFSTI Prices: HC$1.00 MF$0.50

Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
RESULTS FROM THE OBSERVATION OF THE ECLIPSE OF THE SUN ON 15 FEBRUARY 1961 ON THE 4.5 cm WAVELENGTH.
Research translation,
by A. P. Molchanov and N. G. Peterova. Apr 65, 6p
Contract AF19 628 5034
AFCRL G-T-R-65-1; TT 65-62900
Unclassified report

Trans. of Solnechnye Dannye (USSR) n12 p55-7 1961.

Descriptors: (*Radio astronomy, Solar eclipses), (*Solar eclipses, Radio astronomy), (*Astrophysics, Solar eclipses), Solar radiation, Solar atmosphere, Extraterrestrial radio waves, Superhigh frequency, Solar spectrum, USSR.

AD-619 264 Div. 2/1
CFSTI Prices: HC$1.00 MF$0.50

Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
SPECTRA AND MAGNETIC FIELDS FROM LOCAL SOURCES, HAVING OBSERVED THE SUN DURING THE ECLIPSE OF 15 FEBRUARY 1961.

Research translation,
by A. P. Molchanov. Apr 65, 11p
Contract AF19 628 5034
AFCRL G-T-R-65-2 TT 65-62901

Unclassified report

Trans. of Solnechnye Dannye (USSR) n2 p53-8 1962.
See also AD-619 263.

Descriptors: (*Solar eclipses, Radio astronomy), (*Radio astronomy, Solar eclipses), (*Astrophysics, Solar eclipses), Solar radiation, Solar atmosphere, Solar spectrum, Extraterrestrial radio waves, Superhigh frequency, Magnetic fields, USSR.

AD-619 328 Div. 2/1, 8/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
NEW SYSTEM OF MODULATED RADIO RECEPTION OF WEAK SIGNALS AND ITS APPLICATION FOR THE CREATION OF A RADIO TELESCOPE OF ULTRA-HIGH RESOLVING POWER,
by V. V. Vitkevich. 4 Aug 65, 8p
Rept. no. FTD-TT-65-570 Unclassified report
TT 65-62934
Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady, v102 n3 p469-72 1953.

Descriptors: (*Radio astronomy, Radio equipment), Extraterrestrial radio waves, Galaxies, Radio reception, Antennas, Radio interferometers, Modulators.

04. Atmospheric Sciences

AD-618 695 Div. 2/7
CFSTI Prices: HC$3.00 MF$0.75

Oklahoma Univ., Norman.
A COMPARISON OF TECHNIQUES FOR THE SYNTHESIS OF 25 MILLIBAR HEIGHT AND TEMPERATURE FROM KNOWN DATA AT 100 MILLIBARS.
Master's thesis,
by Phillip W. Goertz. 1965, 66p
Unclassified report

Descriptors: (*Atmospheric sounding, Numerical methods and procedures), (*Weather forecasting, Mathematical prediction), Density, Synthesis, Equations, Determination, Wind, Upper atmosphere, Programming(Computers), Atmospheric temperature, Barometric pressure, All-weather aviation.

Four approaches were taken toward devising means for synthesizing information on wind and temperature profiles at the altitudes of supersonic aircraft. Approach 1 (AD-416 049) assumes that 24 km is an isopycnic level. Computer programs were written in Fortran for the solution, by quadrant and cubic methods and with the 1410 computer, of the equation for the temperature gradient and the resultant height and temperature from the temperature gradient. Approach 2 assumes isothermalcy between the 100- and 25-mb surfaces; a Fortran program is given for obtaining the 25-mb height and temperature data. Approach 3 was statistical with climatological development of a vertical temperature gradient and led to a computer program and a refinement in Approach 4. Approach 4 led to a program that corrected the 25-mb computer temperature (from a constant linear temperature gradient) by a regression equation and used the corrected temperature for obtaining a new linear temperature gradient for computing the 25-mb height. Data for evaluating these techniques were obtained from stations listed in the U.S. Weather Bureau 'Northern Hemisphere Data Tabulations' for 16 Feb to 15 May 1961 and also for Shemya, Alaska, for April 1961. The techniques were only partially successful or near failure.

AD-618 698 Div. 2/7, 8/6
CFSTI Prices: HC$3.00 MF$0.75

Washington State Univ., Pullman.
A STUDY OF FIELD ALIGNED IRREGULARITIES FROM THREE OBSERVATION POINTS.
Master's thesis,
by Dale M. Ranz. 1965, 55p
Grant NSF GP-2701
Unclassified report

Descriptors: (*Ionospheric propagation, Radio waves), (*Radio waves, Ionospheric propagation), (*Electron density, Ionosphere), (*Electromagnetic wave reflections, Ionosphere), Solar wind, Terrestrial magnetism, Magnetic fields, Configuration, Atmosphere, Radar signals.

An investigation of field aligned irregularities was performed using 18 Mc/s backscatter radar data from Washington State University, Stanford University, and the Plum Island Site of the Air Force Cambridge Laboratories. Differences were found in the field aligned echo occurrence patterns at the three stations. A definite latitudinal difference of diurnal variation existed. WSU and AFCRL had peaks of field aligned activity in 1964 at a time near sunset while Stanford University's peak occurred at the time of midnight. Seasonal variation of FAE activity at WSU and AFCRL indicated peaks of activity during the summer for the quiet period of the solar cycle. Solar cycle variations at WSU included changes in the daily and seasonal times of peak occurrence of recorded FAE's. In 1958, WSU had the diurnal peak of activity at midnight and the seasonal peaks at the time of the equinoxes. Field aligned echo observations at these three stations are in general agreement with other methods of observing field aligned irregularities, particularly previous high-latitude Spread-F observations. (Author)

AD-618 708 Div. 2/7, 8/6
CFSTI Prices: HC$3.00 MF$0.75

Electrical Engineering Research Lab., Univ. of Illinois, Urbana.
IONOSPHERE RESEARCH.
Quarterly progress rept. no. 6, 1 Jan-31 Mar 65,
by H. D. Webb. 31 Mar 65, 65p
Contract DA36 039AMC03703E, Proj. 1C0 14501B11A, Task 1C0 14501B11A00
Unclassified report

See also AD-612 484.

Descriptors: (*Atmospheric sounding, Radar reflections), (*Ionosphere, Scientific research), Moon, Radar reflectors, Ionospheric propagation, Magneto-optic effect, Electron density, Very high frequency, Medium frequency, Data processing systems.

Moon reflected signals were received on 46 days during the quarter, for 382 hours at 150.6 mc. Signals at 413.25 mc were also received during 44 of the observation days, so that the total Faraday rotation angle could be resolved on those days. Diurnal average curves for observation periods in September, October, November and December, 1964, are presented. A master's thesis study dealing with the correlation of electron content irregularities and irregularities in the horizontal component of the earth's magnetic field is nearing completion. Using quantitative data from correlated irregularities, velocities of motion of ionospheric disturbances have been calculated which fit a 12-hour cycle. A thesis for the M.S. degree dealing with a comparison of methods of resolving the n x 180 degree ambiguity of the Faraday rotation angle is presented. Several new M.S. thesis studies have been started. (Author)

AD-618 720 Div. 2/3, 2/5
CFSTI Prices: HC$4.00 MF$1.00

Wisconsin Univ., Madison. Dept. of Meteorology.
THE INTERRELATIONSHIP OF LAKE ICE AND CLIMATE IN CENTRAL CANADA.
Technical rept.,
by James D. McFadden. Jul 65, 133p
Rept. no. TR-20
Contract Nonr120207, Proj. NR387 022
Unclassified report

Descriptors: (*Climatology, Canada), (*Ice, Lakes), Aerial photography, Freezing, Melting, Phase studies, Meteorological parameters, Correlation techniques, Geography.

In order to use the distribution of lake ice to analyze climate of a particular region, one must know which climatic factors are related to the freezing and thawing of lakes. The major goal of this study is to map the freezing and thawing of lakes in a particular region and to relate certain aspects of climate to these events. A second objective, which is actually a corollary to the primary objective, is to evaluate the effects of the morphology of lakes on their response to climate, and, after determining these effects, to examine the possibility of

estimating mean depths of lakes remotely. The majority of investigations involving the interrelationship of lakes and climate have dealt with single lakes or, at most, lakes within a single region. To obtain a large scale regional picture of this interrelationship it was necessary to use aerial reconnaissance and remote sensing techniques. Since the detailed information that can be gathered when dealing with a single lake cannot be obtained in a regional study, the observations reported here must necessarily be more general in nature.

AD-618 721 Div. 2/7, 25/8
CFSTI Prices: HC$3.00 MF$0.75

Wisconsin Univ., Madison. Dept. of Meteorology.
A CORRECTION FOR THE NET RADIOMETER REFLECTION ERROR AND ANALYSIS OF MEASURED NET RADIATION VALUES FOR CANADA.
Technical rept.,
by Denford D. Finke and Wayne M. Wendland. Jul 65, 86p Rept. no. TR-19
Contract Nonr120207, Proj. NR387 022
Unclassified report

Descriptors: (*Radiometers, Errors), (*Solar radiation, Canada), (*Lakes, Thermodynamics), Reflection, Emissivity, Surface temperatures, Albedo(Astronomy), Cloud cover, Corrections, Polyethylene plastics, Fourier analysis, Reports.

A correction factor is developed to convert measured net radiation values obtained from a net radiometer to the net radiation for a lake based on the reflectance difference of water and polyethylene surfaces. Formulae are presented to calculate the reflectance of a polyethylene and water surface given the angle of incidence of the solar beam (date and time). Daily, monthly, and annual values of measured net radiation were calculated for four central Canadian sites for the period 1960 through 1963. These values are compared with the calculated estimates of Simpson, London, and Budyko, and with measured values recorded by the Meteorological Branch, Department of Transport of Canada for five other Canadian sites. The measured net radiation gradient is directed normal to the tree line, and stations in areas of similar plant communities report similar net radiation regimes. Relationships between net radiation and mean daily cloud cover are investigated. The technique of Fourier analysis is used to study the asymmetry of the annual net radiation curves.

AD-618 723 Div. 2/7, 1/4
CFSTI Prices: HC$5.00 MF$1.00

Travelers Research Center, Inc., Hartford, Conn.
CASE STUDIES OF FOG AND LOW CLOUDS IN THE WASHINGTON, D. C. MESONETWORK AREA.
Final rept.,
by Keith D. Hage and Herbert D. Entrekin.
Jun 65, 158p Rept. no. 7468-166
Contract FA65WA1192, Proj. 150 535 02A
SRDS RD-65-32
Unclassified report

Descriptors: (*All-weather aviation, District of Columbia), (*Fog, District of Columbia), (*Cloud cover, District of Columbia), Ceiling, Visibility, Meteorological parameters, Weather forecasting, Correlation techniques, Weather communications, Terminal fight facilities.

The spatial representativeness of surface observations at the U.S. Weather Bureau mesonetwork surrounding Washington, D. C. was investigated using autocorrelation coefficients. Data consisted primarily of ceiling, visibility, atmospheric transmission, and surface wind observations from five periods (cases) of low cloud and fog during three winter months. Closer-than-conventional station spacings, while generally too large for detailed analysis of visibility and transmission changes, permitted study of low-cloud formation, movement, and dissipation. Network data revealed air-flow disturbances including meso-scale low-pressure centers, windshift lines, and weak cyclonic vortices imbedded in larger-scale low-pressure troughs. Low cloud and fog, associated with some distrubances, were tracked across the network. Low-level wind divergence from time-space means were computed for two areas in each case; these divergence values were very useful for identifying and analyzing both moving and stationary distrubances. Level-of-saturation changes due to advective changes in temperature and specific humidity over sloping terrain, computed for one case, agreed reasonably well with observed ceiling changes. A canopy-like structure along the forward edge of a moving low-cloud band, in one case, was attributed to vertical wind speed shear. Evidence was found of a reduction of wind speed in the Potomac River Valley south of Davison that significantly affects the behavior of low cloud and fog. Under bands or blankets of low clouds, highest station elevations experienced lowest visibilities and most persistent fog; the higher stations experienced less fog during periods of fog blanket within a shallow inversion. (Author)

AD-618 759 Div. 2/7

Air Force Cambridge Research Labs., Bedford, Mass.
INDICATIONS OF A LUNAR SYNODICAL PERIOD IN UNITED STATES OBSERVATIONS OF SUNSHINE.
Environmental research papers,
by Iver A. Lund. 14 Aug 64, 25p
Rept. nos. AFCRL-65-397, ERP-108
Proj. 8624, Task 862402
Unclassified report

Pub. in Journal of Atmospheric Sciences v22 n1 p24-39 Jan 1965 (Copies not available to DDC or Clearinghouse customers)
Presented at the Annual Meeting of the Pacific Division, American Association for the Advancement of Science (45th), Vancouver, B. C., 22 Jun 64.

Descriptors: (*Solar radiation, Periodic variations), Moon, Lunar environment, Sun, Light, Correlation techniques, Weather forecasting, Astrophysics, Meteorology, Atmosphere.

An analysis of daily observations of sunshine taken in the central and northeastern United States during the spring and summer indicates the presence of a lunar synodical period. Less than average sunshine is observed during the first and third weeks of the lunar month and more than average sunshine is observed during the second and fourth weeks. Although this lunar period is significant by most statistical tests, the possibility that its appearance is due to a combination of the smoothing procedure and the temporal and spatial correlation among the observations cannot be completely ignored. (Author)

AD-618 777 Div. 2/7, 20/2, 12/1

New Hampshire Univ., Durham.
NEUTRON ALBEDO MEASUREMENTS ON POLAR ORBITING SATELLITES.
Scientific rept. (Revised ed.),
by J. H. Trainor and J. A. Lockwood. 24 Mar 64, 12p Rept. no. SR-3
Contracts AF19 628 2352, AF19 604 4552,
Proj. 8600, Task 860003
AFCRL 64-795 Unclassified report

Pub. in Journal of Geophysical Research v69 n15 p3115-23 Aug 1 1964 (Copies not available to DDC or Clearinghouse customers). Revision of manuscript submitted 6 Jan 64.

Descriptors: (*Upper atmosphere, Neutron flux), (*Neutron flux, Upper atmosphere), (*Albedo, Measurement), Cosmic rays, Secondary emission, Scientific satellites, Polar orbit trajectories, Neutron detectors, Proportional counters.

An experiment to measure the earth's neutron albedo was flown on three polar orbiting Agena satellites in 1962. The detector, a BF3 counter within a moderator, was surrounded by a ring of charged-particle proportional counters to discriminate against neutrons produced by protons in the detector assembly. The results show an albedo-flux of 0.085 ± 0.03 n/sq cm sec at the equator at 300-km altitude, in agreement with the rocket measurements of Bame et al. and the calculations of Lingenfelter. However, at high latitudes we find 0.24 ± 0.06 n/sq cm sec, a factor of 4 below the calculations of Lingenfelter. The appendix outlines calculations that have been used to estimate the neutron production by primary cosmic-ray protons on the detector assembly and the vehicle itself. These calculations are compared with the experimental measurements of production in the detector assembly. (Author)

AD-618 796 Div. 2/7, 2/1

Saskatchewan Univ., Saskatoon.
GALACTIC HYDROGEN AS A HAZARD IN AURORAL SPECTROSCOPY,
by L. E. J. Montbriand, B. A. Tinsley, and A. Vallance Jones. 1965, 14p
Contract AF19 628 2829

Unclassified report

Research done in cooperation with Defence Research Northern Lab., Fort Churchill, Manitoba, and with Southwest Center for Advanced Studies, Dallas, Tex., under Grant NSG269 62. Pub. in Canadian Journal of Physics v43 p782-92 May 1965 (Copies available only to DDC users). Manuscript version available from CFSTI HC$1.00, MF$0.50 as N65-17601, 22p.

Descriptors: (*Aurorae, Line spectrum), (*Hydrogen, Interstellar matter), (*Line spectrum, Aurorae), Galaxies, Nebulae, Interference, Night sky.

Hydrogen emissions from diffuse galactic nebulae in the Milky Way region have been found to interfere seriously at times with studies of the occurrence of auroral hydrogen emissions made with patrol spectrographs. Charts have been prepared in which the brightness of galactic hydrogen is plotted in galactic coordinates as contour lines of constant brightness in Rayleighs. This presents the information available from the astronomical literature in a form suitable for use in upper atmosphere spectroscopy. (Author)

AD-618 882 Div. 2/7, 25/8
CFSTI Prices: HC$2.00 MF$0.50

Naval Postgraduate School, Monterey, Calif.
A STUDY OF DIABATIC HEATING EFFECTS ON THE DEVELOPMENT OF PRESSURE WAVES.
Master's thesis,
by Elizabeth M. Barrett. 1965, 36p

Unclassified report

Descriptors: (*Microbarometric waves, Thermodynamics), (*Thermodynamics, Microbarometric waves), Mathematical models, Meteorological parameters, Air mass analysis, Mathematical prediction, Meteorology, Mechanical waves.

A baroclinic model programmed for numerical solution is used to investigate the effects of diabatic heating on the development of pressure waves for periods up to 24 hours. Several forms of the model are studied with results being obtained for various wavelengths. The results lead to some meteorological improbabilities; however, the relative development of the pressure wave appears valid for short time periods. (Author)

AD-618 883 Div. 2/7, 12/5
CFSTI Prices: HC$3.00 MF$0.75

Naval Postgraduate School, Monterey, Calif.
AN EXPERIMENT IN MODIFYING OBJECTIVE 500-mb CONTOUR ANALYSES USING TIROS IX NEPHANALYSES.
Master's thesis,
by Theodore C. Casimes and Jerry G. Swor. 1965, 69p

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Weather forecasting, Meteorological satellites), (*Meteorological satellites, Weather forecasting), Cloud cover, Aerial photographs, Vortices, Wind, Velocity, Jet streams(Meteorology).

One of the numerical operational products of the United States Navy Fleet Numerical Weather Facility (FNWF) is the objective analysis of 500-mb contours on a hemispheric basis. Up to mid 1965, this analysis has been accomplished without use of weather-satellite observations. The period of 14 thru 20 February 1965 is selected as an experimental test period for the purpose of modifying the FNWF 500-mb analyses in the sparse-data region of the central North Pacific Ocean at 00Z. Synoptic scale phenomena depicted on Tiros IX nephanalyses are used as basis for the analysis modification. Modified 24- and 48-hour prognoses are made and verified. Results are interpreted in light of the experimental nature of the project, restricted time interval selected and experience level of the authors in the field of satellite meteorology. (Author)

AD-618 885 Div. 2/7, 25/8
CFSTI Prices: HC$3.00 MF$0.75

Naval Postgraduate School, Monterey, Calif.
INVESTIGATION INTO THE SHORT-PERIOD ADVECTIVE CHANGE OF SEA SURFACE TEMPERATURE.
Master's thesis,
by W. Patrick Law. 1965, 60p

Unclassified report

Descriptors: (*Oceans, Heat transfer), (*Heat transfer, Oceans), Surface temperatures, Marine meteorology, Wind, Mathematical models.

An investigation of the advection of sea surface temperature during a 24-hour period is made. Wind-induced currents are shown to be the phenomenon primarily responsible for this short-period advection. The effects of other wind-induced heat exchange processes which reinforce the advective change are estimated. A graphical comparison of isotherm displacements and mean wind field show the apparent response of the sea surface to the changing wind field. A forecasting model for sea surface temperature change based on the varying wind is developed. This model permits the magnitude of the advective component of sea surface temperature change to be compared to the total local change. (Author)

AD-618 911 Div. 2/7, 9/1, 25/3
CFSTI Prices: HC$4.00 MF$1.00

Harvard Univ., Cambridge, Mass. Div. of Engineering and Applied Physics.
A THREE FLUID MODEL IONOSPHERE.
Technical rept.,
by Craig Comstock. Jun 65, 150p Rept. no. TR-2
Contract Nonr186620; Grant NSF GP2226
Proj. NR062 199

Unclassified report

Descriptors: (*Ionosphere, Atmosphere models), (*Fluid flow, Ionosphere), Atmosphere electricity, Plasma physics, Boundary layer, Electron density, Temperature, Electric fields, Ions, Gravity.

This paper is intended as a contribution to the understanding of the distribution of particles in a planetary atmosphere and the mechanisms responsible for maintaining that distribution. Model atmosphere are considered which have relatively simple chemical compositions and which are ionized to some degree. The distribution of particles throughout the atmosphere, the associated electric fields and the boundary conditions which are necessary to maintain the distributions are discussed. The problem considered here is to obtain some further insight into the mechanism which controls the distribution of particles in an ionosphere. The roles played by diffusion, the electric field and the boundary conditions are of interest. A more general set of equations is derived for the distribution of particles than has been previously published. This set of equations is applied to a series of simple models, one of which is a reasonable model for the F layer of the Earth's ionosphere. Some conclusions are drawn on the various mechanisms involved in maintaining the structure of planetary atmospheres. (Author)

AD-618 921 Div. 2/7, 2/3
CFSTI Prices: HC$3.00 MF$0.75

United Aircraft Corp., East Hartford, Conn.
PREDICTION OF WINTER AND SUMMER CYCLONES.
Final rept. for Oct 64-Jun 65,
by Frederick P. Ostby and Keith W. Veigas.
Jul 65, 64p
Contract AF19 628 3437, Proj. 1.0, Task 1.7
ESD TR-65-11

Unclassified report

Subcontracted to Travelers Research Center, Inc., Hartford, Conn. Rept. no. 7463-173.

Descriptors: (*Cyclones, Mathematical prediction), (*Weather forecasting, Cyclones), (*Climatology, Cyclones), Air mass analysis, Northern Hemisphere.

This report presents results and equations for the 12-, 24-, and 36-hr prediction of cyclone displacement and change in central pressure for the Northern Hemisphere. For application of these equations to summer cyclones, the Northern Hemisphere was divided into six areas; for application to winter cyclones, only three of these areas were treated because the other three were covered previously. The technique employed features a moving-coordinate grid system for predictor tabulation, and a screening regression analysis for the derivation of the prediction equations. These equations were tested on an independent data sample and yielded results superior to climatology for all areas tested. The incorporation of 500-mb perfect prognoses as predictors appeared to have only limited success. (Author)

AD-619 039 Div. 2/7, 12/1, 30/3
CFSTI Prices: HC$5.00 MF$1.00

Barnes Engineering Co., Stamford, Conn.
SATELLITE SPECTROMETER. PHASE II. BALLOON FLIGHT MODEL.
Final rept.,
by Harry Breindel and James E. Moorhead. 30 Jun 64, 169p Rept. no. 4696
Contract Cwb10419

Unclassified report

See also AD-411 354.

Descriptors: (*Meteorological satellites, Spectrum analyzers), (*Spectrum analyzers, Infrared spectroscopy), Infrared radiation, Meteorological balloons, Measurement, Temperature, Airborne, High altitude, Meteorological instruments, Bolometers, Design, Performance-(Engineering).

The United States Weather Bureau in co-operation with the National Aeronautics and Space Administration has undertaken a program directed toward the development of a Satellite Infrared Spectrometer (SIRS). The spectrometer will accurately measure the intensity of radiation from the earth and its atmosphere in seven spectral bands. The infrared radiation data will be used to determine atmospheric temperatures at various altitudes. The Phase II portion of the program involved the design, development, and testing of three Satellite Infrared Spectrometers suitable for use in balloon-borne high altitude tests.

AD-619 163 Div. 2/7, 30/2
CFSTI Prices: HC$4.00 MF$1.00

General Dynamics/Convair, San Diego, Calif.
COMPUTER ANALYSES OF METEOROLOGICAL SATELLITE DATA.
Final rept. for Apr 64-Apr 65,
by Walter A. Marggraf. Jul 65, 129p
Rept. no. GD/C-DBB-013
Contract AF19 628 4026, Proj. 6698, Task 669802
AFCRL 65-446

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Meteorological parameters, Meteorological satellites), (*Programming(Computers), Meteorological parameters), Infrared radiation, Surface temperatures, Albedo(Astronomy), Cloud cover.

Computer methods were used to process and analyse Tiros video camera and infrared radiometer data. Surface temperature and albedo estimates were made by applying certain derived calibration and correction functions to the Tiros data. The surface feature characteristics for high and low cloud, water, desert, land, ice and snow areas were explored by computer generated infrared displays, frequency scatter diagrams, and an infrared data correlation process. The radiation intensities emitted from a Rayleigh scattering atmosphere and received by a Tiros video camera were computed and results tabulated. An albedo estimating algorithm was derived from this scattering model and used to generate rectified, mapped and gridded albedo mosaics from calibrated Tiros video data. Automatic cloud cover analyses such as cloud amount, average albedo per unit area, and cloud banding indicators were performed. The method of determining cloud banding information was derived using a two-dimensional power spectrum analysis. (Author)

AD-619 170 Div. 2/7
CFSTI Prices: HC$3.00 MF$0.50

Air Force Cambridge Research Labs., Bedford, Mass.
MEAN ATMOSPHERIC PROPERTIES IN THE RANGE 30 TO 300 KM.
Air force surveys in geophysics,
by K. S. W. Champion. Jun 65, 51p
Rept. nos. AFCRL-65-443, AFSG-164
Proj. 6690, Task 669003
Unclassified report

Descriptors: (*Atmosphere models, Physical properties), Atmospheric temperature, Barometric pressure, Tables, Molecular weight, Nitrogen, Oxygen, Helium, Argon, Density, Low altitude.

A planned COSPAR publication contains a set of atmospheres for several latitudes and times of year for the altitude region 30 to 80 km developed by G. V. Groves. A second set of atmospheres was developed by W. Priester and I. Harris ('The upper atmosphere in the range from 120 to 800 km,' Proposed CIRA, 1964) for the region between 120 and 800 km for various solar fluxes and times of day. For the purpose of connecting these two sets of atmospheres and also to provide average values of the physical properties, a mean reference atmosphere was prepared as described in this report. The Mean Reference Atmosphere was defined as follows: Between 30 and 80 km the model represents mean conditions throughout the year for latitudes near 30 degrees. Between 120 and 300 km the model represents mean conditions over a 24-hour period for a 10.7-cm wavelength solar flux F of 150 X 10 to the minus 22d power w/sq m/c/s. Between 80 and 120 km a model was developed which provides a smooth connection between the above two parts of the mean atmosphere. (Author)

AD-619 171 Div. 2/7
CFSTI Prices: HC$2.00 MF$0.50

Air Force Cambridge Research Labs.,
Bedford, Mass.
EVALUATION OF THE T-755/GMQ-20 WIND SPEED AND DIRECTION TRANSMITTER.
Instrumentation papers,
by Russell M. Peirce. Jun 65, 34p
Rept. nos. AFCRL-65-444, IP-69
Proj. 433L
Unclassified report

Descriptors: (*Anemometers, Tests), (*Wind-direction indicators, Tests), Wind tunnels, Configuration, Amplifiers.

The paper presents the test objectives, procedures, and results of an evaluation of the T-755/GMQ-20 Wind Speed and Direction Transmitter. Electrical and wind tunnel tests were performed to determine the operational capabilities of the T-755 when used in a typical operational wind-system configuration from which the AM-1806/GMQ Amplifier Assembly had been removed. Results revealed that the T-755 could drive up to 10 readouts, without being overloaded, under laboratory conditions. Restrictions and recommendations for calibration in a typical field configuration are presented. (Author)

AD-619 188 Div. 2/7
CFSTI Prices: HC$0.50 MF$2.00

Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
AN EXPERIMENTAL OBJECTIVE ANALYSIS IN THE TROPICS,
Technical paper,
by Michio Yanai. Oct 64, 26p Rept. no. TP-62
Unclassified report

Research supported by National Hurricane Research Proj., U. S. Weather Bureau, Miami, Fla.

Descriptors: (*Weather forecasting, West Indies), (*Air mass analysis, West Indies), Meteorological charts, Meteorological parameters, Upper atmosphere, Wind, Marine meteorology, Caribbean Sea, Weather stations, Weather communications.

A version of the 'correction' objective map analysis scheme is developed and tested for the surface meteorological elements and the upper-air winds in the Caribbean region. In order to overcome the difficulty of getting reasonable analysis over the oceanic area devoid of data, a successive vertical differential analysis technique is employed for the upper wind analysis. Surface map analysis serves to obtain a reliable base for the upper wind analyses. Analysis of wind fields both at the surface and at upper levels is independent from pressure or height of constant--pressure surface-- observations. A statistical adjustment process is introduced to improve the surface pressure analysis with assistance from the independent wind analysis. For the upper wind analyses, vertically averaged winds over 50-or 100-mb pressure intervals are used. Besides a general description of the correction method employed, some technical problems in handling operational data are mentioned. In upper wind analysis, special caution is needed to insure a reasonable analysis over wide open areas without stations. It is found that the correction method tends to build a peculiar distortion of analyzed pattern in these areas. The results based on the experimental computations are illustrated with charts and discussed with some statistical results. (Author)

AD-619 192 Div. 2/7, 12/1, 30/5
CFSTI Prices: HC$1.00 MF$0.50

Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
NUMERICAL ANALYSIS OF TIROS RADIATION OBSERVATIONS.
Technical paper,
by Ferdinand Baer and William Kamm. Jun 65, 25p
Rept. no. TP-67
Contract DA28 043AMC01303E
Unclassified report

Descriptors: (*Meteorological satellites, Infrared scanning), (*Data processing systems, Weather forecasting), (*Weather forecasting, Data processing systems), (*Infrared scanning, Meteorological satellites), Infrared radiation, Magnetic recording systems, Meteorological charts, Numerical analysis, Programming(Computers).

TIROS III radiation measurements are taken from binary tape, selected for a given geographic region, accepted under satisfactory model conditions and interpolated to points for which no fix is given. These raw data are then fit to a uniformly spaced set of grid points covering the region of interest. The fitting procedure is either a least squares polynomial fit or a weight function fit, the choice depending on the nature of the data in the influence region about the grid point. A sample analysis and statistical information on data distribution are presented to suggest the effectiveness of the analysis procedure to the type of data under consideration. (Author)

AD-619 196 Div. 2/7, 15/1
CFSTI Prices: HC$3.00 MF$0.75

Naval Postgraduate School, Monterey, Calif.
AN EVALUATION OF THE U. S. NAVY STRATOSPHERIC EXTRA-POLATION EQUATIONS AND AN INTER-COMPARISON OF SEVERAL METHODS OF 100,50 AND 30-mb ANALYSES.
Master's thesis,
by Richard C. Carrigan and Richard J. Pagnillo.
1965, 88p
Unclassified report

Descriptors: (*Stratosphere, Atmospheric temperature), (*Mathematical prediction, Meteorological parameters), Equations, Analysis of variance, Climatology.

In 1960 the United States Navy Weather Research Facility, Norfolk, Virginia, (NWRF) derived a set of linear regression equations having as their purpose to extrapolate vertically height and temperature data up to the 100-,50-, and 30-mb levels. The equations are statistically evaluated, particularly for the latitude band 30-40 degrees, with a view toward improving their usage in objective analysis by the United States Navy Fleet Numerical Weather Facility, Monterey, California (FNWF). It is found that the equations' usefulness depends on the 'normality' of the synoptic situation, but in general the subject re-evaluation agrees well with tests conducted by NWRF for previous years. An intercomparison of stratospheric analyses at 100-, 50-, and 30-mb, as produced by the Institute of Meteorology and Geophysics of Berlin, Germany, the United States Weather Bureau, the Third Weather Wing of the United States Air Force, and FNWF indicates the necessity of actual stratospheric data (not just regression equations) for analysis at polar latitudes. Several schemes for objective stratospheric analysis, involving minimal use of data, are suggested. (Author)

AD-619 202 Div. 2/7
CFSTI Prices: HC$1.00 MF$0.50

Miami Univ., Coral Gables, Fla. Inst. of Marine Sciences.
THREE DIMENSIONAL ANALYSIS OF A PRECIPITATION-FREE, SEA-BREEZE FRONT BY RADAR, TIROS, VISUAL, AND MESOSYNOPTIC DATA,
by H. V. Senn and H. P. Gerrish. 1965, 6p
Unclassified report

Descriptors: (*Marine meteorology, Sea breeze), (*Sea breeze, Air mass analysis), (*Air mass analysis, Sea breeze), Tropical cyclones, Seacoast, Florida, Meteorological radar, Meteorological satellites, Cloud cover, Aerial photography, Radar echo areas, Atmospheric motion, Three-dimensional flow.

Two precipitation-free radar thin bands, viewed at Miami on October 23 and 24, 1963, while hurricane Ginny was off the northeast coast of Florida, were relatively unique in that they were almost stationary for many hours in the immediate vicinity. These lines existed only in the lowest 1000 ft on the radarscope, and many field observations taken on both sides of the line indicate that they cannot be attributed to birds, insects, or other particulate matter in the atmosphere. The lines were from 30 to 55 miles long and oriented so that major portions were found over the ocean at nearly right angles to the coast. It has been shown that they were precipitation-free and at least one of them was the combined result of a sea-breeze front and the hurricane Ginny circulation. Both the Tiros VII cloud pictures and the radar composites of the hurricane Ginny precipitation pattern confirmed a connection between the thin band and an apparent spiral band tail in the later stages of the thin band's lifetime. Considering the high radar signal strength received from the thin band and the radar refractive geometry for the two radars which viewed the thin band simultaneously but from different sites, it seems most realistic to consider that these were actually ground targets detected at abnormal ranges due to superrefraction. Although the extremely low-level nature of this type of thin band has been established at the University of Miami many times, it has not yet been possible to obtain the horizontal and vertical refractive index changes within the lowest 1000 ft of the atmosphere in the immediate vicinity. (Author)

AD-619 251 Div. 2/7
CFSTI Prices: HC$3.00 MF$0.75

Lichtklimatisches Observatorium, Arosa (Switzerland).
VERTICAL OZONE DISTRIBUTION OVER AROSA, AUGUST 1963-DECEMBER 1964.
Final rept.,
by Hans Ulrich Dutsch. Mar 65, 78p
Grant AF EOAR62 115
AFCRL 65-419
Unclassified report

Prepared in cooperation with The National Center for Atmospheric Research, Boulder, Colo.
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See also AD-439 211.

Descriptors: (*Ozone, Atmosphere), (*Atmosphere, Ozone), Distribution, Oscillation, Solar radiation, Geophysics, Switzerland, Atmospheric sounding.

Another set of Umkehr data (August 1963-December 1964) from the routine observations at Arosa was processed by using a newly developed evaluation technique and improved corrections for higher order scattering. The influences of these changes on the results were studied. Some interesting anomalies observed during this period as well is slow fluctuations of ozone concentration at different levels are discussed. An interesting long trend variation in the upper stratosphere which seems to follow the solar cycle is pointed out, demonstrating the need for continuation of such observations over an extended period. (Author)

AD-619 252 Div. 2/7, 4/4, 4/2
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., Philadelphia, Pa. Missile and Space Div.
AN EXPERIMENTAL STUDY OF THE DEIONIZATION OF NO(+).
Scientific rept.,
by Marlyn H. Bortner. Apr 65, 34p
Rept. nos. SR-1; 214-218S1
Contract AF19 628 4153, Proj. 7673
AFCRL 65-391
Unclassified report

Descriptors: (*Atmosphere, Recombination reactions), (*Nitrogen compounds, Recombination reactions), (*Recombination reactions, Ions), Oxides, Diatomic molecules, Dissociation, Nitrogen, Oxygen, Reaction kinetics, Electrons, Density, Atomic energy levels.

An experimental study of the deionization of NO(+) was carried out. The ion were formed by a Penning effect collision between metastable argon atoms and NO molecules. The process was efficient. The deionization process was a combination of the dissociative recombination NO(+) + e yields N + O and the mutual neutralization NO(+) + NO2(-) yields NO + NO2, the NO2(-) being formed by a three-step process -- Penning dissociation of NO, 3-body formation of NO2 from O and NO, and 3-body attachment to NO2. If all the deionization were due to the NO(+) + e

reaction the rate constant found would be 2 x 10 to the -7 ±.5 power. Reasonable assumptions allow a crude estimate of the NO(+) + NO2(-) rate constant of 2 x 10 to the -8 ±1 power. (Author)

AD-619 253 Div. 2/7, 4/4
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., Philadelphia, Pa. Missile and Space Div.
RESEARCH DIRECTED TOWARD AN INVESTIGATION OF THE CHEMICAL KINETICS OF ATMOSPHERE DEIONIZATION.
Final rept.,
by Marlyn H. Bortner. Apr 65, 37p
Rept. no. 214-218F
Contract AF19 628 4153, Proj. 7673
AFCRL 65-392

Unclassified report

Descriptors: (*Atmosphere, Recombination reactions), (*Recombination reactions, Reaction kinetics), Ions, Electrons, Atomic energy levels, Dissociation.

The chemical kinetics of the deionization of a highly ionized atmosphere was considered. Reaction rate constants are suggested for each of the many reactions considered. These suggested values are believed to be the best presently available but it is realized that lack of available data introduces much uncertainty in the values. (Author)

AD-619 255 Div. 2/7
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
ACTA METEOROLOGICA SINICA, VOL. 29, NO. 3-4, 1958: TABLE OF CONTENTS.
Apr 65, 15p Rept. no. E-TC-Ch-65-29
Contract AF19 628 5073
TT 65-62894

Unclassified report

Abstract trans. of Ch'i Hsiang Hsueh-Pao (Chinese People's Republic). v29 n3/4 p143-295 1958.

Descriptors: (*Meteorology, China), Scientific research, Abstracting, Weather forecasting, Rainfall, Meteorological parameters, Mathematical prediction, Climatology.

Contents: The combined deductive-empirical method for the forecasting of local rainfall and the results of preliminary testing in China; a simple two-layer model and its extension; utilization of past data in numerical forecasting; a new method of preparing 1000 and 500-mb prognostic charts by graphical integration; a study of the mean interdiurnal pressure and temperature variability at the surface and of the mean interdiurnal altitude and temperature variability at the 300, 500 and 700-mb levels over China; tendency computations for baroclinic development considering the kinematic boundary condition of the earth's topography; the variability of precipitation in eastern China; a three-dimensional study of the vorticity field over East Asia during the outbreak of a cold wave (a summary); the abrupt change of circulation over the northern hemisphere during June and October; autumn rain areas in China; analysis of the structure of a cold wave over East Asia; and simple approximate solutions for the finite-difference Poisson equation.

AD-619 259 Div. 2/7
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
ACTA METEOROLOGICA SINICA, VOL. 31, NOS. 3-4, 1961/1962: TABLE OF CONTENTS AND ABSTRACTS.
Apr 65, 18p Rept. no. E-TC-Ch-65-32
Contract AF19 628 5073
TT 65-62896

Unclassified report

Abstract trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v31 n3/4 p191-370 1961/1962.

Descriptors: (*Meteorology, China), Scientific research, Abstracting, Convection, Atmosphere, Micrometeorology, Terrain, Air mass analysis, Meteorological instruments, Weather forecasting.

Contents: The dynamics of development of thermal convection in a stratified atmosphere; a preliminary investigation of the micrometeorological effect of artificial-wind barriers; the forecast of meteorological elements for a non-linear problem using a three-layer model in a spherical system; a barotropic model with the effect of orography taken into consideration; the role of temperature advection in frontogenesis and cyclogenesis; variations of the transfer of physical quantities and conversion of energies during the breakdown and formation of zonal circulation; and a radiometer equipped with a plastic wind shield.

AD-619 260 Div. 2/7
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
ACTA METEOROLOGICA SINICA, VOL. 34, NO. 2, 1964: TABLE OF CONTENTS AND ABSTRACTS.
Apr 65, 12p Rept. no. E-TC-Ch-65-30
Contract AF19 628 5073
TT 65-62897

Unclassified report

Abstract Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v34 n2 p127-252 1964.

Descriptors: (*Meteorology, China), Air mass analysis, Asia, Atmosphere, Solar radiation, Jet streams-(Meteorology), Weather forecasting, Terrain, Atmospheric motion, Turbulence.

Contents: Spectral analysis of the monthly 500-mb circulation indexes over Asia; a comparison of several radiation charts; the budget of atmospheric radiation energy over eastern Asia and the budget of solar radiation energy of the earth and the atmosphere; a study of the retreat of the West Pacific subtropical high during 4 - 12 August 1958; an analysis of the 500-mb circulation in the middle and lower Yangtze valley during the mei-yu period; a program library for numerical weather prediction; the influence of large mountain barriers on the displacement of barotropic disturbances; a preliminary study of the instability of the waves along the intertropical convergence zone; the turbulence in the surface layer of the atmosphere under different thermal stratifications; a dynamic analysis of the development of cumulonimbus incus; and a preliminary study of the formation of pressure jumps by small mountain barriers using a two-layer model.

AD-619 262 Div. 2/7
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
ACTA METEOROLOGICA SINICA, VOL. 29, NO. 1, 1958: TABLE OF CONTENTS AND ABSTRACTS.

Apr 65, 8p Rept. no. E-TC-Ch-65-28
Contract AF19 628 5073
TT 65-62899

Unclassified report

Abstract trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v29 n1 p1-62 1958.

Descriptors: (*Meteorology, China), Scientific research, Abstracting, Weather forecasting, Air mass analysis, Water vapor, Meteorological parameters, Mathematical prediction.

Contents: The influence of the roughness of the surface on the wind profile in the upper planetary boundary layer over Dairen; a test of a graphical method for quantitative precipitation forecasting in China; a statistical study of the eddy transport of vorticity in a large-scale time-averaged motion; a statistical study of Fjortoft's graphical method; water-vapor transfer and water balance over eastern China; a frontal theta sub se chart and its application to the analysis of the upper boundary of cold-wave fronts in China; and a hydrodynamic model for studying the seasonal variation of general circulation and long-range forecasting.

AD-619 268 Div. 2/7
CFSTI Prices: HC$3.00 MF$0.75

California Univ., Los Angeles. Dept. of Meteorology.
THE STRUCTURE OF THERMAL CONVECTION IN THE LOWER ATMOSPHERE.
Final rept., pt. 2,
by Leonard O. Myrup. Feb 65, 86p
Contracts OCD OS62 143, OCD PS64 24, Proj. 2606

Unclassified report

Descriptors: (*Convection, Atmosphere), (*Atmosphere, Convection), Atmospheric sounding, Aircraft, Instrumentation, Measurement, Atmospheric temperature, Turbulence, Boundary layer, Meteorology.

An experimental study of atmospheric convection in lowest 100 m under conditions of strong surface heating and light winds is presented. Using an instrumented light aircraft, measurements were made of the fluctuating temperatures and vertical air speeds over a desert dry lake during the daytime. Root-mean-square values of these quantities and the convective heat flux were calculated and related to theoretical and laboratory results. (Author)

AD-619 288 Div. 2/7, 25/7
CFSTI Prices: HC$1.00 MF$0.50

Hebrew Univ., Jerusalem (Israel). Dept. of Physics.
X-RAY EXCITATION OF THE SECOND POSITIVE AND FIRST BANDS OF NITROGEN,
by W. Low. 1964, 7p
Contract N62558 4347, Proj. NR018 807

Unclassified report

Descriptors: (*Aurorae, Molecular spectroscopy), (*Nitrogen, Band spectrum), (*Band spectrum, Excitation), (*X-rays, Aurorae), Electrons, Photoelectric effect, Diatomic molecules, Emissivity, Israel.

It is shown that x-rays can produce emission of light in air and can excite the second positive and first negative bands of nitrogen found so prominently in aurorae.

AD-619 303 Div. 2/7, 4/4
CFSTI Prices: HC$3.00 MF$0.75

International Meterological Inst., Stockholm (Sweden).
A PHOTOCHEMICAL MODEL FOR THE SPACE-TIME VARIATIONS OF THE OXYGEN ALLOTROPES IN THE 20 TO 100 KM LAYER,
by James R. Blankenship. 1965, 54p

Unclassified report

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Descriptors: (*Photochemistry, Upper atmosphere), (*Upper atmosphere, Ozone), (*Ozone, Periodic variations), (*Atmospheric models, Periodic variations), Atmospheric motion, Atmospheric temperature, Atoms, Molecules, Oxygen, Dissociation.

A time dependent model atmosphere is developed which will provide the height distribution of ozone as a function of location, time of year, time of day and meteorological conditions in the absence of transport and diffusion. The resulting distributions are then compared to the photochemical equilibrium distribution as obtained from the infinite-day approximations, i.e. those stationary solutions obtained by assuming that time goes to infinite with the radiation remaining constant.

AD-619 344 Div. 2/7, 2/5
CFSTI Prices: HC$1.00 MF$0.50

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
HEAT TRANSFER CHARACTERISTICS OF NATURALLY COMPACTED SNOW,
by Yin-Chao Yen. Jun 65, 14p
Research rept. 166
Proj. 1V014501B52A31

Unclassified report

Descriptors: (*Heat transfer, Snow), (*Snow, Heat transfer), Compressive properties, Thermal conductivity, Water vapor, Diffusion, Gas flow, Transport properties.

The heat transfer characteristics of naturally compacted snow have been determined experimentally. The results are interpreted as effective thermal conductivity k sub e and water vapor diffusivity D sub e. In contrast with the results obtained from previous investigations on unconsolidated snow, in the case of naturally compacted snow, values of k sub e and D sub e are found to be not only a function of air flow rate but also of snow density. From present as well as previous studies, it can be concluded that air flow has considerable effect on the thermal conductivity and water vapor diffusivity of unconsolidated and naturally compacted snow. It is reasonable to state that the essential factor influencing the formation of depth hoar and avalanches is a prolonged process of simultaneous heat and mass transfer due to steep temperature gradients imposed on a snow layer. (Author)

AD-619 355 Div. 2/7, 30/3

Nebraska Univ., Lincoln. Dept. of Horticulture and Forestry.
A MICROCLIMATE SAMPLING SYSTEM FOR FIELD PLOT AND ECOLOGICAL RESEARCH,
by Norman J. Rosenberg and Robert W. Allington.
1964, 7p
Contract CWB10428 Unclassified report

Pub. in Ecology v45 n3 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Climatology, Samplers), (*Micrometeorology, Samplers), Ecology, Meteorological instruments, Potentiometers, Junction boxes, Electric cables, Temperature, Dew point, Soils, Air, Solar radiation, Wind, Radiometers, Anemometers.

A microclimate sampling system capable of recording the output of air, soil and dew point temperature, soil thermal flux, solar and net radiation, and wind velocity sensors was built at the Nebraska Agricultural Experiment Station. A multipoint self-balancing potentiometer monitors and records the output of the sensors in a prearranged sequence. Junction boxes and cabling arrangements are flexible enough to permit a wide choice in disposition and selection of sensors. The system functioned in the field during a 50-day period without interruption. Data obtained with the system illustrate the nature and magnitude of immediate climatic changes induced by the installation of a wind barrier in a field of growing dry beans. Comparisons of air and dew point temperatures measured on the site and at Weather Bureau installation 150 ft and 8 miles distant reveal great differences between the field and Weather Bureau observations and further illustrate the magnitude of error possible when basic temperature and humidity measurements from a remote location are used to derive secondary climatic parameters for a field plot or study area. (Author)

AD-619 378 Div. 2/7, 30/3
CFSTI Prices: HC$1.00 MF$0.50

Atlantic Research Corp., Alexandria, Va.
RESEARCH AND DEVELOPMENT OF A CONTINUOUS ATMOSPHERIC MEASUREMENT SYSTEM.
Final technical rept. for Dec 63-Dec 64,
by Richard H. Johns and Alton M. McKissick, Jr.
May 65, 24p
Contract AF33 615 1383, Proj. 6373, Task 637302
AMRL TR-65-75

Unclassified report

Descriptors: (*Atmospheric sounding, Hygrometers), (*Hygrometers, Electrolytic cells), Humidity, Water vapor, Carbon dioxide, Atmosphere, Measurement, Meteorological instruments, Meters.

The application of electrolytic hygrometer cells for the measurement of atmospheric moisture and carbon dioxide was investigated. A carbon dioxide-moisture converter was devised. After system feasibility was proved, a laboratory model was built. Some difficulties were experienced with capillary electrolytic cells and flow control. The selection of optimum components is important. (Author)

05. Behavioral and Social Sciences

AD-618 697 Div. 28/3, 16/15
CFSTI Prices: HC$2.00 MF$0.50

Indiana Univ., Bloomington.
THE INFLUENCES OF SEPARATIONS AND LUMINANCES OF NEIGHBORING INDUCING FIELDS UPON THE FOVEAL CRITICAL FLICKER FREQUENCY.
Master's thesis,
by Constantine Anthony Ricciardi. Sep 65, 49p
Unclassified report

Research supported by the U. S. Air Force.

Descriptors: (*Visual perception, Stimulation), (*Psychophysiology, Visual perception), (*Retina, Stimulation), Illumination, Images, Resolution, Inhibition.

The purpose of the study is to investigate the effects of test and inducing field separations upon the foveal critical flicker frequency (c.f.f.), with increasing inducing luminance levels. Emphasis is placed on the determination of: (1) how, and at what inducing luminance levels, the maximal c.f.f. peaks shift; (2) changes in the magnitude of the c.f.f. maxima; (3) the rate at which changes in c.f.f. diminish. An analogy is made between the psychophysical results of the study and the findings of electrophysiological investigations concerning lateral inhibitory interaction within the retina.

AD-618 705 Div. 32/4, 32/8, 18/3
CFSTI Prices: HC$1.00 MF$0.50

Carnegie Inst. of Tech., Pittsburgh, Pa. Graduate School of Industrial Administration.
SUMMARY AND EVALUATION OF RECENT WORK IN MEASURING THE PRODUCTIVITY OF FEDERAL AGENCIES.
Management sciences research rept.,
by John W. Kendrick. Jun 65, 23p
Rept. no. MSRR-44
Contract Nonr76024, Proj. NR047 048
Unclassified report

Descriptors: (*United States Government, Management engineering), (*Management planning, United States Government), Effectiveness, Costs, Logistics, Government procurement, Budgets, Measurement, Production, Department of Defense.

The paper contains first a discussion of the nature and meaning of productivity index numbers. Productivity measures are viewed as ratios of output to input, in real terms. They largely reflect changes (or differences) in the technology and organization of production over time (or between similar producing units). The applicability of productivity measurement systems to Federal Government organizations is discussed. Results of the Bureau of Budget report 'Measuring Productivity of Federal Government Organizations' are summarized. While the report covers only 5 Federal, civilian organizations, the author concludes that productivity measurement could usefully be extended to most other civilian agencies, and to some functions of the Department of Defense, particularly in the supply and maintenance areas. (Author)

AD-618 730 Div. 32/7, 15/1
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
THE GAME OF SCIENCE,
by T. A. Cowan. Jul 65, 22p
Rept. no. P-3182
Unclassified report

Prepared for presentation at the Symposium on Philosophy of Science (Section L), sponsored by the American Association for the Advancement of Science, Berkeley, Calif., Dec 65.

Descriptors: (*Scientific research, Theory), (*Game theory, Scientific research), Operations research, Music, Mathematics, Physics, Chemistry, Biology.

Conditions for the development of an aesthetic for science are propounded. Consideration of the subject includes the question as to whether the pursuit and practice of science can be regarded as seeking the structure of spontaneous creativity. The most likely manner by which the structure of spontaneous creativity can be handled is concluded to be the 'game of science.' 'Play' is claimed to be the object of the game and to bear the same relation to the professional activity of the scientist, i.e. organized thought, that physical exercise bears to everyone. The course of scientific play leads to full exercise of intuition within the rules of scientific method, which rules for the purpose of game play are not the same as those for scientific work. The ordering conception of the game is the notion of system to which each game must conform, the system itself conforming to the requirements of an equilibrium system. An example of a simple game would be to show how a business firm could be driven to bankruptcy by one or all of a number of actions. An example of a complex game would be to design a utopia to replace the City of Los Angeles. The report includes sections on the structure, rules, and postulates of the games.

AD-618 731 Div. 32/8, 18/7
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
A CONCLUDING NOTE FOR NATO STRATEGY AND ECONOMICS,
by Malcom W. Hoag. Jun 65, 28p
Rept. no. P-3158
Unclassified report

Descriptors: (*Political science, Military organizations), (*Military organizations, Deterrence), (*Deterrence, Military organizations), Military strategy, Defense systems, Nuclear weapons, Arms control, Limited war, Cold war, Foreign policy, Government-(Foreign), Armed forces(Foreign), Economics.

Contents: Arms fundamentals: Deterrence, defense, and arms races; Some complexities in military planning; Economics and alliance: Economic problems of alliance; On NATO pooling; NATO Doctrine and force posture: Limited war; Interdependence; Rationalizing NATO strategy; Strategic nuclear forces: Nuclear policy and France; An Atlantic nuclear force.

AD-618 737 Div. 23/5
CFSTI Prices: HC$2.00 MF$0.50

Human Resources Research Office, George Washington Univ., Alexandria, Va.
CONTROLLING THE QUALITY OF TRAINING.
Technical rept.,
by Robert G. Smith, Jr. Jun 65, 48p
Rept. no. TR-65-6
Contract DA44 188ARO2, Proj. 2J024701A712, Task 2J024701A712 01
Unclassified report

Descriptors: (*Military training, Standards), Education, Effectiveness, Students, Instructors, Tests, Military personnel, Performance(Human).

The need for a quality control system in a military training program and methods of establishing such a unit are described and evaluated in this report, which is part of a research project in the technology for developing training. It is stated that the purpose of quality control is to ensure a satisfactory standard of competence among the students who graduate, to maintain this quality by a continuous monitoring process, and to improve training where it is found to be deficient. In order to function successfully, a quality control system should constitute a separate unit, independent of but cooperating with the instructional departments. Attention is given to proficiency testing as the chief means of measuring the success of the training program, with emphasis upon the importance of a uniform standard and consistent method in the preparation, administration, and scoring of tests. (Author)

AD-618 753 Div. 32/8, 18/7
CFSTI Prices: HC$5.00 MF$1.00

Georgetown Univ., Washington, D. C.
UNITED NATIONS AND INTERNATIONAL MILITARY FORCES.
Master's thesis,
by Donald J. Alberts. 1 Dec 64, 161p
Unclassified report

Descriptors: (*United Nations, Armed forces operations), Political science, Economics, History, South Korea, Egypt, Congo(Leopoldville), Cyprus, Military personnel, Armed forces(Foreign), Disarmament, Government(Foreign), Military organizations, Limited war, Cold war.

The purpose of the study is to investigate the use of international military forces within the framework of the United Nations with a view to isolating the problems facing the continued use of such forces. This study is concerned with separating the major problems that have beset UN forces in the past. The purpose of isolating and examining such problems is to define, if possible, the limits within which UN military forces can be employed. The area is viewed from practical, political, and economic viewpoints. Military considerations are examined to the extent that such considerations constitute barriers to successful force deployment and operation.

AD-618 756 Div. 23/5, 1/4
CFSTI Prices: HC$6.0 MF$1.25

Grumman Aircraft Engineering Corp., Bethpage, N. Y. Research Dept.
KINETIC CUEING IN SIMULATED CARRIER APPROACHES. SUPPLEMENT I. STUDY DETAILS. Final technical rept.,
by Joseph N. Ruocco, Patrick A. Vitale, and Robert C. Benfari. 28 Apr 65, 208p
Contract N61339 1432
NAVTRADEVCEN 1432-1-S1
Unclassified report

See also AD-617 689.

Descriptors: (*Proprioception, Pilots), (*Carrier landings, Flight simulators), (*Flight simulators, Carrier landings), Naval training, Cockpits, Motion, Display systems, Approach, Simulators, Specifications, Wiring diagrams.

Pairs of matched pilots were trained using a flight simulator in a carrier-landing maneuver under two conditions, kinetic and static. Technical Report: NAVTRADEVCEN 1432-1 is a summary report of this study. This supplement to the report is for the technical reader and provides detailed information on the equipment used, the experimental design and the reduction of data. (Author)

AD-618 770 Div. 28/3, 16/1

Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
HUMAN RESPONSES TO SONIC BOOM,
by Charles W. Nixon. May 65, 11p
Rept. no. AMRL-TR-65-9
Proj. 7231, Task 723103

Pub. in Aerospace Medicine v36 n5 p399-405 May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Sonic boom, Reaction(Psychology)), Jet plane noise, Shock waves, Supersonic characteristics, Tolerances(Physiology), Thresholds(Physiology), Humans, Behavior, Attitudes.

Aircraft in supersonic flight generate pressure waves that are perceived along the ground as sonic booms. The impact of the sonic boom phenomenon upon humans has generated a great deal of concern and conjecture regarding individual responses and perceptions, group responses, and physiological responses. Data accumulated during the past several years by specific governmental and aviation agencies have provided some insight into the manner in which individuals and communities have responded to the sonic boom. The report summarizes these data in terms of the nature of human responses and the manner in which they occur, factors influencing acceptance of the boom, the possibility of physiological injury, psychological effects, and some reports of alleged minor damage to property and their relation to human reactions. (Author)

AD-618 773 Div. 28/3, 16/15, 16/1

Army Medical Research Lab., Fort Knox, Ky.
RELATIONSHIPS FOR TEMPORARY THRESHOLD SHIFTS PRODUCED BY THREE DIFFERENT SOURCES,
by John L. Fletcher and Michel Loeb. 30 Jun 65, 13p Rept. no. 633
Proj. 3A014501A74D, Tasks 01, 02
Unclassified report

Pub. in Auditory Research v5 p41-5 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Thresholds(Physiology), Noise), (*Noise, Thresholds(Physiology)), Sound, Hearing, Audiofrequency, Auditory perception, Psychophysiology.

To determine the similarities, differences, and correlations in temporary threshold shifts (TTS) from three different sound sources, 12 young persons with normal hearing were exposed serially to a low pass and a high pass noise and to an arc discharge produced impulse sound. The TTS's obtained differed drastically, as expected. For the impulse noise, TTS's at adjacent frequencies tended to be significantly correlated while non-adjacent frequency TTS's were not. This pattern was not as consistent for the other two sound sources (noise). These results suggest that there is no general factor of susceptibility to TTS. (Author)

AD-618 776 Div. 28/3, 28/1

Allan Memorial Inst. of Psychiatry, Montreal (Quebec).

ON CENTRAL AND AUTONOMIC NERVOUS SYSTEM MECHANISMS IN CONDITIONING, LEARNING, AND PERFORMANCE,
by Robert B. Malmo. 29 Aug 62, 38p
Unclassified report

Research supported in part by Office of the Surgeon General, Dept. of the Army, Washington, D. C., and Public Health Service, Washington, D. C.
Pub. in Canadian Journal of Psychology v17 n1 p1-36 Mar 1963 (Copies available only to DDC users).

Descriptors: (*Brain, Stimulation), (*Autonomic nervous system, Conditioned reflex), (*Conditioned reflex, Autonomic nervous system), Central nervous system, Learning, Behavior, Psychophysiology, Motivation, Pulse rate, Stress(Physiology), Electroencephalography, Electrocardiography, Rats, Canada.

Summary: the autonomic nervous system is definitely tied in with this whole intricate neural network underlying reinforcement; and information concerning changes in the autonomic nervous system under all the different conditions of positive and negative reinforcement should be invaluable in working towards a clearer understanding of reinforcement mechanisms. Combined with behavioural observations and electrical recordings from the brain, the peripheral autonomic changes, in reflecting activity in central mechanisms upstream, may help reveal the neural mechanisms that are essential for reinforcement. (Author)

AD-618 788 Div. 32/2, 30/2

Air Force Cambridge Research Labs., Bedford, Mass.
ON THE RELATIVE EFFICIENCIES OF CONTEXT-FREE GRAMMAR RECOGNIZERS.
Physical and mathematical sciences research papers,
by T. V. Griffiths and S. R. Petrick. Jan 65, 21p
Rept. nos. AFCRL-65-425, PMSRP-111
Proj. 5632, Task 563205

Unclassified report

Pub. in Communications of the ACM v8 n5 p289-300 May 1965 (Copies not available to DDC or Clearinghouse customers)
Revision of manuscript submitted Jan 1964.

Descriptors: (*Language, Programming(Computers)), (*Programming(Computers), Language), Machine translation, Computer logic, Programming languages, Communication theory.

A number of diverse recognition procedures that have been proposed for parsing sentences with respect to a context-free grammar are described in this paper by means of a common device. Each procedure is defined by giving an algorithm for obtaining a nondeterministic Turing Machine recognizer that is equivalent to a given context-free grammar. The formalization of the Turing Machine has been chosen to make possible particularly simple descriptions of the parsing procedures considered. An attempt has been made to compare recognition efficiencies for the procedures defined. For a few simple grammars and sentences a formal comparison has been made. Empirical comparison of the recognition of more realistic programming languages such as LISP and ALGOL has been made by means of a program which simulates the Turing Machine on the Univac M-460 Computer. Several algorithms for producing grammars equivalent to a given context-free grammar have been considered, and the increase in recognition efficiency they afford has been empirically investigated. (Author)

AD-618 78[illegible] Div. 28/5

Colorado Univ., Boulder.
SOME SITUATIONAL AND COGNITIVE DETERMINANTS OF DISSONANCE RESOLUTION,
by O. J. Harvey. 29 Jul 63, 7p
Contract Nonr114707

Unclassified report

Pub. in Journal of Personality and Social Psychology v1 n4 p349-55 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Reasoning, Psychometrics), (*Public opinion, Reasoning), Reaction(Psychology), Motivation, Effectiveness, Social communication.

Ten representatives of each of the 4 main levels of abstractness posited by Harvey, Hunt, and Schroder argued in opposition to their own beliefs about philosophy, under the instructions that their arguments would never be heard by anyone other than themselves (private) or that their arguments would be heard by a university curriculum committee (public). Opinions were retested immediately after argumentation and again 1 wk. later. Opinion change at both retests was affected significantly by concreteness-abstractness and by interaction of this variable with the public-private variation. The latter variable significantly affected change only at Retest 2. Effects of cognitive structure and conditions of commitment on resolution of dissonance was demonstrated. (Author)

AD-618 803 Div. 28/4, 28/5

Texas Univ., Galveston. Medical Branch.
FACTOR ANALYSIS OF SOME PSYCHOMETRIC MEASURES OF IMPULSIVENESS AND ANXIETY,
by Ernest S. Barratt. 11 Jan 65, 7p
Contract Nonr159806

Unclassified report

Pub. in Psychological Reports v16 p547-54 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Psychometrics, Factor analysis), (*Personality, Psychometrics), Anxiety, Emotions, Behavior, Correlation techniques.

Two orthogonal personality traits or predispositions, impulsiveness and anxiety, have been invariant in five separate factor analyses. One of these analyses is presented here along with an item analysis of the Barratt Impulsiveness Scale (BIS) which has a high loading on the impulsiveness factor. The BIS has never significantly correlated with any of the various anxiety or emotional stability measures in over 50 administrations of the scale, further evidence for the invariance of these two second-order factors. (Author)

AD-618 804 Div. 16/12, 16/1

Texas Univ., Galveston. Medical Branch.
EEG CORRELATES OF TONIC IMMOBILITY IN THE OPOSSUM (DIDELPHIS VIRGINIANA),
by E. S. Barratt. 30 Nov 64, 3p
Grant NIH GS127

Unclassified report

Pub. in Electroencephalography and Clinical Neurophysiology v18 p709-11 1965 (Copies available only to DDC users).

Descriptors: (*Mammals, Behavior), (*Electroencephalography, Behavior), Nervous system, Physiology, Muscles, Sleep, Electrocardiography.

Five different behavioral states in the opossum were related to five different EEG patterns. The EEG activity during tonic immobility was characterized by low voltage fast activity. Tonic immobility was always preceded by long bursts of both cortical and amygdaloid alpha range EEG activity which characterized an 'awaking-alert-fixating' state of behavior. However, a similar pattern was also seen in 3 opossums in which tonic immobility could not be obtained. The results suggest that alpha range activity may be a necessary but not sufficient condition for the onset of tonic immobility in this animal. (Author)

AD-618 805 Div. 32/8, 32/4

Wisconsin Univ., Madison. Social Systems Research Inst.
POST COLONIAL POLITICS: A SUGGESTED INTERPRETATION OF THE INDONESIAN EXPERIENCE, 1950-1958,
by Hans O. Schmitt. 1963, 16p
Reprint no. 64
Grant NSF GP705

Unclassified report

Pub. in Australian Journal of Politics and History v9 n2 np Nov 1963 (Copies available only to DDC users).

Descriptors: (*Political science, Indonesia), (*Indonesia, Political science), (*Economics, Indonesia), Commerce, Banking, Consumption, Government(Foreign), Foreign policy, Foreign aid.

AD-618 819 Div. 28/3

McGill Univ., Montreal (Quebec).
FINGER-SWEAT PRINTS IN THE DIFFERENTIATION OF LOW AND HIGH INCENTIVE,
by Robert B. Malmo. 1964, 11p

Unclassified report

Pub. in Psychophysiology v1 n3 p231-40 Jan 1965 (Copies available only to DDC users)
Supported by DRB, NRCC, NIMH, and Army.

Descriptors: (*Psychophysiology, Sweat glands), (*Sweat glands, Psychophysiology), (*Motivation, Psychophysiology), Hands, Performance(Human), Electrocardiography, Muscles, Performance(Human), Correlation techniques, Canada.

The differential effect of incentive on finger sweating compared with the effects on various other physiological measures was investigated in a group of 59 Ss. Finger sweating (FS) appeared slightly superior to palmar conductance (PC) in discriminating between low and high incentive conditions, but heart rate (HR) and muscle potentials appeared to be the best of those discriminators used. Correlations between PC and visual ratings for FS were 0.65 and 0.69 for high and low incentive conditions, respectively. There were numerous significant correlations between physiological measures (at relatively low levels), but the two FS measures correlated only with PC and with each other. Correlations between physiological and performance measures were also obtained. On the one hand HR and electromyograms (EMGs), and on the other PC and FS ratings, differed with respect to the incentive conditions under which significant correlations with performance were obtained. In the main, HR and EMGs showed significant correlations with performance under low, and PC and FS ratings under high incentive. Further evidence for less sweating by dark-skinned Ss compared with light-skinned Ss was reported. (Author)

AD-618 848 Div. 28/3, 16/15

Columbia Univ., New York.
COLOR VISION RESEARCH AND THE TRICHROMATIC THEORY: A HISTORICAL REVIEW,
by Shakuntala Balaraman. 16 May 61, 16p

Unclassified report

Pub. in Psychological Bulletin v59 n5 p434-48 1962 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Color vision, Theory), Colors, Mixtures, Luminescence, Sensitivity, Spectra(Visible + ultraviolet), Psychophysiology, Reviews.

AD-618 849 Div. 28/3, 16/5, 16/1

Columbia Univ., New York.
VISION,
by Conrad G. Mueller and Eda Berger. 1955, 27p
Contract N6onr27109, Proj. 142 404

Unclassified report

Pub. in Annual Review of Psychology v7 p365-90 1956 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Vision, Psychophysiology), Eye, Adaptation(Physiology), Visual perception, Visual acuity, Retina, Stimulation, Spectra(Visible + ultraviolet), Color vision, Optical images, Thresholds(Physiology), After-images, Luminescence, Space perception, Personality, Physiology.

Contents: Physiological mechanisms: Some optical and mechanical characteristics of peripheral systems; Photochemical and chemical properties of the visual system; Electrical activity in the visual system; Psychophysical measurements: Adaptation; Intermittent stimulation; Color theory; Contrast and glare; Movement; Discrimination of depth and distance; Discrimination of location and position; Size and shape; Figural after-effects; Perceptual functions and some past history and personality variables.

AD-618 850 Div. 28/1

Oxford Univ. (England). Inst. of Experimental Psychology.
OVERTRAINING, REVERSAL, AND EXTINCTION IN RATS AND CHICKS,
by N. J. Mackintosh. 17 Apr 64, 6p
Contract N62558 3927

Unclassified report

Pub. in Journal of Comparative and Physiological Psychology v59 n1 p31-6 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Chickens, Learning), (*Rats, Learning), (*Learning, Animals), Brightness, Stimulation, Behavior, Transfer of training, Great Britain.

Overtraining facilitated reversal of a brightness discrimination in rats, but retarded reversal in chicks. 1 explanation for this difference is that the relevant brightness cue was a more dominant one for chicks, so that overtraining could not strengthen the response of attending to it. In

support of this suggestion, chicks did show a significant overtraining reversal effect in a more complex orientation discrimination. 2 further experiments showed that if responses were extinguished before reversal, then the slow reversal learners (nonovertrained rats in the brightness problem, nonovertrained chicks in the orientation problem, overtrained chicks in the brightness problem) showed a significant increase in choice of their former S+ in early reversal trials. (Author)

AD-618 854 Div. 28/1

Oxford Univ. (England). Inst. of Experimental Psychology.
OVERTRAINING, TRANSFER TO PROPRIOCEPTIVE CONTROL AND POSITION REVERSAL,
bn N. J. Mackintosh. 24 Jan 64, 12p
Contract N62558 2453

Unclassified report

Pub. in The Quarterly Journal of Experimental Psychology v17 pt1 p26-36 Feb 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Learning, Transfer of training), (*Transfer of training, Learning), Proprioception, Vision, Rats, Great Britain.

If rats are overtrained on a visual discrimination they generally learn the reversal of the discrimination faster than non-overtrained rats. In position discriminations, however, this effect does not generally hold--indeed several investigators have found overtraining to retard position reversal. One of the important differences between the two types of problem seems to be the presence of irrelevant cues in visual discriminations, and their absence in position discriminations. It is suggested that a second important feature of position discriminations is that overtraining usually causes control of the maze running habit to be transferred from external to proprioceptive stimuli, and that successful reversal cannot normally occur until external control is re-established. In two experiments a study by Krechevsky and Honzik (1932) is repeated with certain modifications, with results that support this hypothesis; and a third experiment provides direct evidence of transfer to proprioceptive control in a T-maze. It is shown that this analysis will explain the apparently conflicting results of all recent position reversal experiments. (Author)

AD-618 872 Div. 32/3
CFSTI Prices: HC$3.50 MF$1.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
INDEX OF ABBREVIATED AND FULL TITLES OF SCIENTIFIC AND TECHNICAL PERIODICAL LITERATURE.
1959, 250p Rept. no. F-TS-9640/III
TT 59-21176

Unclassified report

Partial trans. of mono. Ukazatel Sokrashchennykh i Polnykh Nazvanii Nauchnoi i Tekhnicheskoi Literatury, Moscow, 1957 p1-137.

Descriptors: (*Periodicals, USSR), (*USSR, Periodicals), (*Scientific research, Periodicals).

This index contains the listing of all the Soviet and foreign periodical and non-periodical series publications (printed in languages employing the Russian alphabet), whose materials are processed in the abstract journals of the Institute for Scientific Information, USSR Academy of Sciences; the index represents the most complete Soviet reference publication on the Soviet and foreign periodical literature.

AD-618 895 Div. 28/1, 28/4
CFSTI Prices: HC$5.00 MF$1.00

Purdue Univ., Lafayette, Ind.
MOTIVATIONAL CORRELATES OF INDIVIDUAL DIFFERENCES IN PERFORMANCE.
Final technical rept. for May 61-Jan 65,
by Mark W. Stephens and K. M. Michels. May 65, 152p
Contract AF33 616 7962, Proj. 7183, Task 718305
AMRL TR-65-39

Unclassified report

Descriptors: (*Performance(Human), Motivation), (*Motivation, Psychometrics), Personality, Reaction-(Psychology), Reflexes, Motor reactions, Conditioned reflex, Hands, Verbal behavior, Learning, Test construction(Psychology), Human engineering, Analysis of variance.

A three-year program of research was directed at the development of 'paper and pencil' measurement techniques that would permit the assessment of the potential 'motivatability' of subjects in experiments concerning the effects of environmental stress on human performance. A largely empirical approach was used in this research. Performance measures of a large number of subjects on several different tasks were used as the criterion measures in item analyses of several personality inventory tests. The resultant pool of cross-validated items will, it is hoped, represent a step toward increasing the precision of performance research. (Author)

AD-618 906 Div. 28/1, 28/4
CFSTI Prices: HC$7.00 MF$2.00

Tulane Univ., New Orleans, La. Dept. of Psychology.
FREE ASSOCIATION NORMS BY DISCRETE AND CONTINUED METHODS.
Technical rept.,
by Edward A. Bilodeau and David C. Howell.
Feb 65, 376p Rept. no. TR-1
Contract Nonr47510

Unclassified report

Rept. on Stimulated Recall and Misrecall.

Descriptors: (*Psychometrics, Word association), (*Word association, Psychometrics), Probability, Recall, Statistical analysis, Indexes, Tables.

AD-618 951 Div. 28/4, 23/1
CFSTI Prices: HC$1.00 MF$0.50

System Development Corp., Santa Monica, Calif.
PERCENTAGE DIFFERENCE VS. REGRESSION IN CONSTRUCTING APPLICATION-BLANK KEYS.
Professional paper,
by Dallis K. Perry. 14 Jul 65, 9p
Rept. no. SP-1963

Unclassified report

Presented at the Annual Convention (45th) Western Psychological Association, Honolulu, Hawaii, June 14, 1965.

Descriptors: (*Personnel, Selection), (*Test construction(Psychology), Analysis of variance), Performance(Human, Psychometrics, Standards, Statistical analysis, Correlation techniques, Decision making.

Application-blank scoring keys for two different employee groups and several different criteria were

constructed by both multiple-regression and percentage-difference methods and compared. Multiple regression is unlikely to be superior to percentage difference item selection procedures for constructing application blank keys with small samples. However, with larger samples the regression item-selection procedure is still a candidate. (Author)

AD-618 953 Div. 23/4, 30/2
CFSTI Prices: HC$1.00 MF$0.50

System Development Corp., Santa Monica, Calif.
COMPUTER ASSISTANCE IN TEACHING ENGINEERING MATHEMATICS.
Professional paper,
by Warren J. Pelton and John Staudhammer.
20 Jul 65, 8p Rept. no. SP-2052/001/00
Unclassified report

Descriptors: (*Training devices, Computers), (*Education, Engineering), (*Engineering, Mathematics), Programming(Computers), Instructors.

The engineering community is very much aware of the rapid increase of scientific knowledge and technological applications. Because it is impossible to include all the new knowledge and technology in the engineering curriculum, a new look or restructuring of the engineering curriculum is required. A substantial aid in helping the engineering educator restructure the curriculum is the modern computer. Efficient use of modern computers by instructors of engineering mathematics can eliminate much of the unnecessary rote or mechanical manipulation in many of the courses. Many new and unique computer programs will have to be written for each segment of the engineering curriculum. The faculty and students must be able to understand the use of the computer and be able to access these computer programs during normal classroom study. Computer applicability in individual classrooms will allow for the exploration of many more problems of a greater degree of sophistication and complexity than can be currently explored. This broader case of applied problems will afford the engineering student the opportunity to gain a greater depth of understanding and insight into the applications of modern engineering. (Author)

AD-619 013 Div. 23/5
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
WORKING DAY OF A SPACE PIONEER. YA. G. GAGARIN RE-ENTERS SPACE TRAINING,
by V. Belikov. 31 Mar 64, 8p
Rept. no. FTD-TT-64-149
TT 64-15397
Unclassified report

Unedited rough draft trans. from Izvestiya (USSR) 9 Aug p4 1963.

Descriptors: (*Astronauts, USSR), Parachute jumping, Training.

AD-619 021 Div. 32/8, 32/1
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
SOVIET COLLECTIVIZATION AND CHINA'S 'GREAT LEAP',
by Oleg Hoeffding. Jul 65, 12p Rept. no. P-3183
Unclassified report
Presented at the Conference on Soviet and Chinese Communism, Lake Tahoe, California, 13-7 Jun 65.

Descriptors: (*Agriculture, USSR), (*Political science, China), Communism, Economics, History, Decision making.

The motivations and political mechanics involved in the decisions of the USSR and China to 'plunge' into total collectivism are discussed.

AD-619 029 Div. 28/3, 29/6
CFSTI Prices: HC$2.00 MF$0.50

Lockheed Missiles and Space Co., Sunnyvale, Calif.
STUDY OF HUMAN PERFORMANCE IN A MARK IV PRESSURE SUIT,
by A. K. Miller and R. S. Lincoln. 15 Nov 64, 38p
Rept. no. 6-62-64-19
Unclassified report

Descriptors: (*Pressure suits, Maneuverability), (*Performance(Human), Space crews), Motor reactions, Performance tests, Computers, Oscilloscopes, Rotation, Gloves, Inhibition, Design, Anthropometry, Tracking.

Two subjects wearing Mark IV pressure suits, under both the pressurized and unpressurized condition, were tested on several performance tasks. The purpose of the study was to provide an evaluation of performance tasks under suit conditions. Results of the study indicated that the tasks can be successfully presented on an oscilloscope under computer control to evaluate performance capability of suited crew members. Two interesting effects identified in the experimental data were related to characteristics of the pressure suit. When pressurized: (1) The subjects were hindered in the performance of a tracking task because they were unable to rotate their wrists, and (2) One subject had difficulty operating push buttons, which were separated by 5/8 in. between edges, because of the characteristics of the gloves included with the Mark IV suit. (Author)

AD-619 030 Div. 23/4
CFSTI Prices: HC$1.00 MF$0.50

System Development Corp., Santa Monica, Calif.
SYSTEMS ANALYSIS AND DECISION-MAKING IN EDUCATION.
Professional paper,
by John F. O'Toole, Jr. 28 Jun 65, 20p
Rept. no. SP-2020/000/01
Unclassified report

Presented at the annual banquet of the Council of Directors and Supervisors, Los Angeles City School District, Rodger Young Auditorium, May 12, 1965; Emery Stoops Lecture, Annual Awards Night, Phi Delta Kappa, Alpha Epsilon Chapter, University of Southern California, May 14, 1965.

Descriptors: (*Education, Systems engineering), (*System engineering, Education), (*Decision making, Education), Defense systems.

This paper defines the terms 'system,' 'system approach,' and 'systems analysis,' and describes a variety of systems in defense and non-defense areas. In education, the primary focus of systems analysis is on detailed description of operations, understanding the functional interactions of system components, and the flow of information for decision-making within the system. General principles involved in systems analysis are described and some outcomes of such analysis are provided. Implications of systems analysis for more effective educational decision-making are also discussed. (Author)

AD-619 046 Div. 23/4, 28/2, 30/2
CFSTI Prices: HC$3.00 MF$0.75

Stanford Research Inst., Menlo Park, Calif.
EXPLORATIONS IN THE AUTOMATION OF SENSORIMOTOR SKILL TRAINING.
Final rept.,
by Douglas C. Engelbart and Philip H. Sorensen.
May 65, 81p
Contract N61339 1517, Proj. 7820
NAVTRADEVCEN 1517-1
Unclassified report

Descriptors: (*Teaching machines, Psychophysiology), (*Motor reactions, Training), (*Training, Teaching machines), (*Coding, Teaching machines), Office equipment + supplies, Computers, Feedback, Touch, Visual perception, Feasibility studies, Punched cards, Effectiveness, Automatic, Performance tests, Learning, Data processing systems, Operators(Personnel), Computer personnel.

The purpose of the study was to explore the feasibility of using a computer to teach a psychomotor task, i.e., operation of a 5-key chord keyset for binary coding. The other functions studied were mode of presenting prompts (visual, tactual) and effects of feedback upon performance. The automated visual and tactual prompting modes were compared with what might be considered to be a 'traditional' mode, in which subjects (Ss) learned the code by referring to a code sheet. The results indicated that none of the methods of prompting was superior to the others. However, the fact that Ss could be taught to perform a psychomotor task by means of a computer is a significant advance in training procedures. The results also indicated that the provision of feedback aided performance for each of the prompting modes.

AD-619 047 Div. 23/5, 1/5, 1/4
CFSTI Prices: HC$3.00 MF$0.75

Douglas Aircraft Co., Inc., Long Beach, Calif.
Aircraft Div.
USING A GENERALIZED CONTACT FLIGHT SIMULATOR TO IMPROVE VISUAL TIME-SHARING.
Final rept. for Jun 63-Dec 64,
by Richard F. Gabriel, Alan A. Burrows, and Paul E. Abbott. Apr 65, 83p
Contract N61339 1428, Proj. 7670, Task 7670 1
NAVTRADEVCEN 1428-1 Unclassified report
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Flight simulators, Training devices), (*Training devices, Aviation safety), (*Aviation safety, Training devices), Aviation accidents, Human engineering, Pilots, Marine Corps, Scheduling, Multiple operation, Transfer of training, Performance(Human), Optical scanning, Visual perception, Display systems, Training.

Thirty Marine A-4 pilots were given eight carefully designed time-sharing training sessions in a simple, generalized visual flight simulator and then compared with a control group on performance in the highly specific A4 operational flight trainer equipped with a visual display. Results indicated improved ability to detect simulated mid-air collision hazards without compromising performance in the other flight tasks. Such training therefore is recommended as an aid in reducing the mid-air collision hazard. (Author)

AD-619 069 Div. 28/4
CFSTI Prices: HC$2.00 MF$0.50

Educational Testing Service, Princeton, N. J.
ITEM SAMPLING IN TEST THEORY AND IN RESEARCH DESIGN.
Technical rept.,
by Frederic M. Lord. Jun 65, 38p Rept. no. RB-65-22
Contract Nonr275200, Proj. NR151 201
Unclassified report

Descriptors: (*Test construction(Psychology), Sampling), (*Sampling, Test construction(Psychology)), Mathematical models, Psychometrics, Errors, Statistical analysis, Analysis of variance.

New and less new concepts and results in the item-sampling model for mental test theory are summarized. It is shown that certain research studies--typically those concerned with group means--could use item-sampling methods to improve their efficiency of experimental design. Various sampling error formulas are derived, making it possible to determine whether and to what extent various uses of item sampling will increase the information gained by the research worker. (Author)

AD-619 089 Div. 30/1, 26/2, 30/2
CFSTI Prices: HC$3.00 MF$0.75

Lockheed Missiles and Space Co., Sunnyvale, Calif.
PERT PROGRAMMERS' GUIDE FOR PHASE ONE IBM TYPE 709/7090.
23 Sep 60, 69p Rept. no. LMSD-652070
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Management planning, Programming-(Computers)), (*Programming(Computers), Management planning), Management control systems, Instruction manuals, Digital computers, Punched cards, Magnetic tape.

PERT is a long-range program of developing automated aids to management of major development projects such as Polaris. The program includes such operations-research type objectives as time-cost tradeoffs. This guide provides information on PERT network (sample), PERT information worksheets, EAM punch cards, and computer printouts. The PERT program is written for an IBM 7090 or 709 computer with indirect addressing of data-channel commands, a 32768-word memory, and 6 tape units each on Channels A and B. Also needed are a type 714 card-to-tape converter and a type 720 printer.

AD-619 122 Div. 28/3, 28/1, 16/15

Columbia Univ., New York.
AREAL EFFECTS IN FOVEAL BRIGHTNESS DISCRIMINATION,
by P. Ratoosh and C. H. Graham. 20 Jan 51, 9p
Contract N6onr27109, Proj. NR142 404
Unclassified report

Pub. in Journal of Experimental Psychology v42 n6 p367-75 Dec 1951
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Visual perception, Brightness), (*Brightness, Visual perception), Intensity, Thresholds(Physiology), Adaptation(Physiology), Retina, Vision, Eye, Nerve cells, Psychophysiology.

The effect on foveal brightness discrimination of changes in the diameters of the test- Delta I sub t, and adapting (I-) fields has been investigated. An apparatus has been described designed to present to one eye of the S a foveal,

circular illuminated I-field to which may be added a concentric, circular Delta I sub t. field, smaller than or equal in size to the I-field. The Delta I sub t. field was presented for a duration of .02 sec. For constant sizes of test- and adapting-field, the curve relating log Delta I sub t/I and log I falls rapidly at low values of log I; it then levels off at medium values of log I. At high values of log I, when the adapting-field is not larger than the rod-free area of the fovea, the curve usually shows a small final rise. For a given brightness and constant test-field size, Delta I sub t/I decreases as the size of the adapting field increases. For a given brightness and constant adapting-field size, increasing the size of a very small test-field lowers Delta I sub t/I. For a moderately large test-field an increase in size has little effect on Delta I sub t/I. For a test-field almost as large as its adapting-field, an increase in size up to the limits of the adapting field may result in increases in Delta I sub t/I, especially at high adapting-field brightnesses. The results are discussed in terms of a neural interaction hypothesis. (Author)

AD-619 123 Div. 28/3, 28/1, 16/15

Columbia Univ., New York
FREQUENCY OF SEEING FUNCTIONS FOR INTENSITY DISCRIMINATION AT VARIOUS LEVELS OF ADAPTING INTENSITY,
by Conrad G. Mueller. 1 Feb 50, 14p
Contract N6onr27109, Proj. NR142 404
Unclassified report

Pub. in The Journal of General Physiology v34 n4 p463-74 Mar 20 1951
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Visual perception, Intensity), (*Intensity, Visual perception), Thresholds(Physiology), Adaptation-(Physiology), Retina, Vision, Eye, Psychophysiology, Absorption spectrum, Statistical analysis.

The percentage of times a human subject detects an increment delta in intensity was determined as a function of the magnitude of the increment and the magnitude of the stimulus (I) to which the increment is added. Foveal stimulation was used, and five frequency of seeing curves were obtained at each of nine values of adapting intensity covering the range from -1.45 to 4.45 log photons. Each frequency of seeing curve shows the percentage of times an increment in intensity is detected as a function of the logarithm of the increment. The slope of the frequency of seeing curve increases slightly with an increase in I and finally becomes independent of I at medium to high intensities. The implications of the results for quantum theories of visual excitation are considered. (Author)

AD-619 155 Div. 23/4, 28/1, 30/2
CFSTI Prices: HC$3.00 MF$0.50

Illinois Univ., Urbana. Training Research Lab.
COMPUTER-BASED INSTRUCTION.
Technical rept.,
by Lawrence M. Stolurow. Jul 65, 52p Rept. no. TR-9
Contracts Nonr398504, Nonr183436, Proj. NR154 239
Unclassified report

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Descriptors: (*Education, Teaching machines), (*Teaching machines, Learning), (*Computers, Education), Programming(Computers), Computer storage devices, Coding, Punched cards, Students.

One purpose of this paper was to present a conceptualization of the teaching-learning process in a way that permits the development of a CBIS (Computer-Based Instructional System). One function of the CBIS is the development of real-time models in the form of computer programs that teach. With these programs, we can perform a second function which is to conduct research relating to the decision processes necessary for teaching. A second purpose was to indicate ways in which SOCRATES (System for Organizing Content to Review and teach Educational Subjects) is being used: (a) to conduct research relating to an idiographic model of tutorial instruction; (b) to study basic variables relating to learning and transfer; and (c) to develop the technology of using a CBIS to generate learning materials. Results from several different applications of SOCRATES were summarized. (Author)

AD-619 164 Div. 23/5, 22/8, 25/4
CFSTI Prices: HC$3.00 MF$0.75

Kollsman Instrument Corp., Elmhurst, N. Y.
SIMULATOR, WEAPON, FIRING AND RANGING (LASER) SYSTEM.
Final rept.,
by Peter Redmond. Mar 65, 96p
Contract N61339 1311, Proj. 3503 4
NAVTRADEVCEN 1311-1
Unclassified report

Descriptors: (*Lasers, Simulation), (*Weapons systems, Simulation), (*Gunnery trainers, Lasers), Tanks, Guns, Firing mechanisms(Weapon), Range finding, Safety, Military training, Photomultipliers, Ruby.

A Laser Weapon Simulator system--a device developed around a laser that simulates the important effects of a tankgun fired at a target, and accordingly enhances the training of tank gunners is described. In operation, this simulator is boresighted with the main tank gun. Aiming is achieved through the existing tank optics; firing is accomplished by depressing the same trigger switch used in firing actual rounds. When the simulator is fired, the laser produces a concentrated red flash on the target which realistically simulates an actual round. Provisions are incorporated for the instructor to introduce deliberate offsets which must then be compensated by the trainee. The theory of operation of the laser (plus optics), and the associated power supply, is presented in detail. Procedures for installing the simulator system on the tank and the target in the downrange area, for performing preoperation checkout, adjustment, and alignment, for conducting training exercises, and for troubleshooting and repairing the equipment, are also provided in detail. Safety precautions necessary in aligning, operating, and repairing the equipment are carefully noted. (Author)

AD-619 168 Div. 28/4, 23/5
CFSTI Prices: HC$2.00 MF$0.50

Naval Personnel Research Activity, San Diego, Calif.
A CRITIQUE OF IPSATIVE MEASURES WITH SPECIAL REFERENCE TO THE NAVY ACTIVITIES PREFERENCE BLANK.
Technical bulletin,
by Lou H. Smith. Jun 65, 34p Rept. no. STB-65-16
Task 3 1605 05 02S2 Unclassified report

Descriptors: (*Psychology, Measurement), (*Psychometrics, Naval personnel), (*Test construction-(Psychology), Psychometrics), Statistical analysis, Correlation techniques.

A review of the relevant literature describing mathematical and empirical properties of ipsative and

nonipsative measures was undertaken. This evaluation led to the explication of a simple procedure for quantifying the 'degree of ipsativity' in psychological measuring instruments. Several published research studies were evaluated against this 'index of ipsativity' leading to a conclusion that purely ipsative test instruments possess such extensive psychometric and statistical limitations that utilization of such instruments is not recommended. It is recommended that future research on the Navy Activities Preference Blank, an ipsative test, be directed toward removal of the purely ipsative properties from this test. (Author)

AD-619 169 Div. 28/4, 23/5
CFSTI Prices: HC$1.00 MF$0.50

Naval Personnel Research Activity, San Diego, Calif.
VALIDATION OF THE 1961 NAVY COLLEGE APTITUDE TEST.
Final rept.,
by Loyda Shears and Leonard Swanson. Jun 65, 25p
Rept. no. STB-65-17
Proj. 3 1604 02 01S2
Unclassified report

Descriptors: (*Aptitude tests, Naval personnel), (*Naval personnel, Selection), (*Naval training, Universities), Officer personnel, Education, Students, Correlation techniques.

The purpose of this study was to evaluate the effectiveness of the NCAT administered in December 1961 for predicting freshman college GPA and Naval Science Course grades. High school ratings were validated along with NCAT total and subtest scores for 1345 midshipment from 42 of the 52 colleges participating in the NROTC (Regular) program. Analyses were made for each school and for the entire sample. Validities of NCAT subtest and total scores were lower than those obtained in three earlier years. The validity of high school ratings for the 1961 sample, however, was similar to those previously obtained. Results of item analysis of one NCAT subtest suggested that improved item selection procedures would be required to increase NCAT validity to earlier validity levels. (Author)

AD-619 173 Div. 28/4, 23/5
CFSTI Prices: HC$1.00 MF$0.50

Naval Personnel Research Activity, San Diego, Calif.
AN EVALUATION OF VARIOUS MEASURES OF HIGH SCHOOL PERFORMANCE IN PREDICTING COLLEGE ACHIEVEMENT FOR FRESHMAN NROTC REGULAR STUDENTS.
Final rept.,
by Edmund Thomas, Patricia Thomas, and Leonard Swanson. Mar 65, 22p Technical Bulletin 65-2
Proj. 3 1604 0201S2
Unclassified report

Descriptors: (*Naval personnel, Selection), (*Naval training, Universities), (*Achievement tests, Naval personnel), Officer personnel, Students, Statistical analysis.

The research was designed to investigate the validity of high school performance, measured in a number of different ways, in the prediction of college freshman grade point average. Grades on high school transcripts obtained from 13 NROTC units were transformed to a 15-point grading scale. Statistical analyses were conducted to determine the validity of individual high school course grades and a number of general curriculum areas as predictors of freshman college grade point average. Academic high school grade average, the grade average of liberal arts courses, and overall high school grade average correlated higher with college achievement that the presently operational High School Rating (HSR), although the increase in validity in each case was not statistically significant. None of the other composites of courses or individual course average attained as high a correlation with the criterion as did HSR. In the averages, Foreign Language, History, and Physics, correlated higher with first year college grade point average than did any other indes of high school performance. It was recommended that HSR be retained as a selector for the NROTC Regular program since it is more easily derived than the grade averages investigated in this study. It was further recommended that a new form specifically requesting high school rank-in-class be developed in an effort to obtain this statistic for all candidates. A suggested format for such a form was included. (Author)

AD-619 186 Div. 23/4, 28/1, 30/2
CFSTI Prices: HC$2.00 MF$0.50

Illinois Univ., Urbana. Training Research Lab.
SYSTEMS APPROACH TO INSTRUCTION.
Technical rept.,
by Lawrence M. Stolurow. Jul 65, 41p
Rept. no. TR-7
Contracts Nonr398504, Nonr183436, Proj. NR154 239
Unclassified report

See also AD-435 032.

Descriptors: (*Education, Teaching machines), (*Teaching machines, Learning), Training devices, Instructors, Models(Simulation), Students, Theory, Programming-(Computers), Feedback, Cybernetics.

This paper has outlined the nature of the systems approach as it relates to instruction. A general, but operational, model of instruction as a tutorial system also was presented. The schematics of an actual computer-assisted instructional model known as SOCRATES have been described. The model is cybernetic. It also relates the learner's characteristics to teaching decisions and in this sense it is idiographic. In addition, it performs the necessary functions for highly adaptive instruction with instructional objectives. As implemented in SOCRATES, this involves a three-process cycle. The first of these consists of the pretutorial decisions which match individual differences among learners. The second of these consists of tutorial decisions which are implementation of a specific set of rules. The third of these consists of the changing of tutorial decisions which involves the substitution of a set of rules whenever the previous set fails to produce the desired performance. (Author)

AD-619 189 Div. 28/4, 28/5
CFSTI Prices: HC$5.00 MF$1.00

Michigan State Univ., East Lansing.
A STOCHASTIC MODEL FOR TIME CHANGES IN A BINARY DYADIC RELATION, WITH APPLICATION TO GROUP DYNAMICS.
Doctoral thesis,
by T. N. Bhargava. 11 Jun 62, 173p
Rept. nos. RM-95; TNB-1
Contract Nonr258702; Grant NSF G18976
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Stochastic processes, Group dynamics), (*Group dynamics, Stochastic processes), Mathematical models, Binary arithmetic, Distribution theory, Psychometrics.

This thesis is concerned with the development of a stochastic model for analyzing time changes in a binary dyadic relation over a finite set of points. For purposes of drawing statistical inference in time the total relation R (A) on the set A is looked upon as an aggregate of its subrelations on subsets of the set A. The number of states in which a subrelation may be found, at any time, is very large; consequently three classification schemes are described to obtain a small number of mutually exclusive and exhaustive classes. Methods are presented to enumerate the number of subrelations of R (A) in various states at any time, and to count the number of transitions from one state to another in time. The process of change in the total relation over time is described as a time-dependent process, and some statistical tests to determine the nature of the dependence are given. Certain aspects of the probability distributions of the random variables R sub ni (number of n-point subrelations of R (A) in state s'i) are discussed in the second part of the thesis. It is shown that the probability distributions of R sub ni may be approximated by Poisson distributions. Finally an application of the model to group dynamics is described and empirical examination of Markov properties is made for a particular set of data. (Author)

AD-619 212 Div. 28/5
CFSTI Prices: HC$2.00 MF$0.50

Emory Univ., Atlanta, Ga.
THE ORGANIZATIONAL BEHAVIORS AND ADAPTATIONS TO ORGANIZATIONAL CHANGE OF SENSITIZER AND REPRESSER PROBLEM-SOLVING GROUPS,
by Arthur M. Cohen. 1965, 43p
Contract Nonr425201; Grant NSF GS501
Unclassified report

Descriptors: (*Group dynamics, Social communication), (*Social communication, Personality), (*Decision making, Group dynamics), Behavior, Adjustment-(Psychology), Analysis.

This experiment was intended to test hypotheses concerning differences between groups of sensitizers and repressers in their adaptation to organizational changes in communication networks and to changes in tasks. The results revealed that the kinds of problem-solving systems that groups developed before and after organizational and task changes were not significantly influenced by differences in sensitization-repression. It was concluded from this experiment that the ability of a group to solve problems and adapt to change rests on both its capacity (largely influenced by the personalities of its members) to withstand threats to and disturbances of its equilibrium (particularly under conditions of high uncertainty and novelty characterizing the early phases of group life and initial introduction to a new or changed environment) and by its ability to cognize correctly (influenced primarily by situational and intellectual factors) about the problems facing it and how to organize in order to deal with such problems.

AD-619 216 Div. 28/5
CFSTI Prices: HC$2.00 MF$0.50

Harpur Coll., Endicott, N. Y.
AN EXPERIMENT ON THE STATUS INCONGRUENCE PHENOMENON,
Technical rept.,
by Donald Trow and Grace Herschdorfer. Jul 65, 31p
Rept. no. TR-3
Contract Nonr367900, Proj. NR170 331
Unclassified report

Research done in cooperation with Ohio State Univ., Columbus.

Descriptors: (*Group dynamics, Leadership), (*Behavior, Group dynamics), Social psychology, Attitudes, Performance(Human), Social communication, Verbal behavior, Perception(Psychology), Statistical analysis.

Status incongruence was experimentally imposed on twelve four-person teams, and their performance, morale, and tendency toward restructuring were compared with control teams that were experimentally congruent. The two status dimensions manipulated to produce congruence or incongruence were the announced class standing of the college Ss and the assignment of the keyman or directive position in the team's organization. The teams performed a laboratory task that consists of co-operative typing on a typewriter altered so as to require multiple typists. Results were: (1) teams congruent initially but free to change structure did not do so; (2) teams incongruent initially tended to change structure but not toward experimentally defined congruence; (3) the person perceived as leader by team members themselves tended to be the one who talked most and made the most suggestions, even if he were a lowerclassman and not the keyman, but the preferred future leader in these cases was often the upperclass man; (4) teams with many discrepancies among these status rankings (but not including the experimentally manipulated keyman ranking) tended to have significantly low task performance and satisfaction. These results, while positive, fall short of giving satisfactory experimental confirmation of the alledged strain toward status congruence. (Author)

AD-619 220 Div. 28/3

Defence Research Medical Labs., Toronto (Ontario).
QUANTITATIVE TACTUAL-KINESTHETIC JUDGMENT.
Research paper,
by A. V. Churchill. 22 Apr 65, 2p Rept. no. RP-589
Proj. D77 94 20 23 Unclassified report

Pub. Perceptual and Motor Skills v20 p1147-8 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Touch, Perception(Psychology)), (*Perception(Psychology), Touch), Hands, Performance-(Human), Visual signals, Stimulation, Errors, Analysis of variance, Performance tests, Motor reactions, Canada.

The results of a previous experiment showed that a bilateral kinesthetic difference did not obtain when tactual-kinesthetic judgments were made with the left and right hands. The present experiment was designed to eliminate the possible contribution of visual and kinesthetic figural aftereffects to the directional bias of errors. Results indicate that performance was equivalent with the left and right hands. (Author)

AD-619 221 Div. 28/3

Defence Research Medical Labs., Toronto (Ontario).
NON-ADDITIVITY OF PERCEIVED DISTANCE WITH THE MUELLER-LYER FIGURE.
Research note,
by M. M. Taylor. 1965, 1p Rept. no. RN-604
Unclassified report

Pub. in Perceptual and Motor Skills v20 p1064 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Perception(Psychology), Psychometrics), Psychophysiology.

Test results indicate that, at least in the Mueller-Lyer figure, it is impossible to infer the relations of

large perceived distances from the relations of their component perceived distances, and hence that there is no single functional relationship (e.g., a power law) between perceived and physical distance.

AD-619 225 Div. 23/5, 24/3
CFSTI Prices: HC$2.00 MF$0.50

Army Personnel Research Office, Office of the Chief Research and Development, Washington, D. C.
ERROR KEYS AS REFERENCE AIDS IN IMAGE INTERPRETATION.
Technical research note,
by Harold Martinek. Jun 65, 30p Rept. no. TRN-153
Proj. 2J620901A721 Unclassified report

Descriptors: (*Photointerpretation, Aerial photographs), (*Photointerpreters, Performance tests), Errors, Identification, Performance(Human), Photographic images, Training, Statistical analysis, Analysis of variance.

The Surveillance Systems Project is directed toward increasing knowledge related to the techniques and procedures for interpreting aerial imagery and reducing extracted information to its most usable form. One Task, specifically concerned with image interpretation displays, conducts research to develop improved reference materials to assist image interpreters in locating and correctly identifying objects of military significance in aerial photographs. Specially developed reference keys are tested in controlled studies with interpreter output measures as criteria. The present publication describes one of the first such studies. An 'error key', developed through analysis of interpreter errors and designed to help interpreters avoid common misidentifications, and a 'rights key' similar to keys currently used by image interpreters, were provided to accompany two sets of aerial imagery. Two performance measures based on this imagery were administered to three matched groups of interpreter trainees. One group used the 'error key', another group used the 'rights key', and a control group used no reference key. Performance data for the three groups--correct identifications, errors, and interpreters' confidence in their identifications--were analyzed. The 'error keys' resulted in substantial decrease in errors and increase in accuracy, but no difference in number of correct identifications. They also affected the differential between interpreters' confidence in right and wrong identifications, increasing the amount of difference in one performance measure, and decreasing the amount in the other. The 'rights key' did not have a significant effect on any aspect of performance measured. (Author)

AD-619 238 Div. 28/1, 16/4

Oxford Univ. (England). Inst. of Experimental Psychology.
SHAPE AND SIZE DISCRIMINATION IN OCTOPUS: THE EFFECTS OF PRETAINING ALONG DIFFERENT DIMENSIONS,
by N. S. Sutherland, N. J. Mackintosh, and J. Mackintosh. 28 Feb 63, 10p
Contract N62558 2453; Grant PHS M5673
Unclassified report

Pub. in Journal of Genetic Psychology v106 p1-10 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Learning, Cephalopoda), (*Cephalopoda, Learning), (*Transfer of Training, Cephalopoda), Perception(Psychology), Reaction(Psychology), Great Britain.

It has been suggested that discrimination learning involves two processes. Animals learn first to switch-in a stimulus-analysing mechanism that yields different outputs for the discriminanda and, secondly, they learn to attach the correct responses to those outputs. This hypothesis predicts that training an animal to respond to one cue should make it more difficult for it to learn to respond to a second type of cue. Previous experiments have shown that when animals trained to respond to one cue are subsequently presented with a problem that can be solved in terms of that cue or in terms of a second cue they do learn something about the second cue. The crucial question for the model proposed is not whether, under these conditions, animals learn something about a second cue, but whether they learn as much as animals not previously trained to respond to the first cue. The present experiment attempts to answer this question. Sixteen octopuses were trained and tested in three stages. In Stage I, one group learned a size discrimination, the other group learned a shape discrimination. In Stage II, all animals learned a new problem. This problem was the same for both groups and could be solved in terms of shape or size differences or both. In Stage III, transfer tests were given with the same shapes as those used in Stage II but no differences in size were present. (Author)

AD-619 248 Div. 23/5, 28/5
CFSTI Prices: HC$1.00 MF$0.50

Naval School of Aviation Medicine, Pensacola, Fla.
VOLUNTARY WITHDRAWAL FROM PRIMARY FLIGHT TRAINING AS A FUNCTION OF THE INDIVIDUAL FLIGHT INSTRUCTOR.
Special rept.,
by Richard S. Pomarolli and Rosalie Ambler. 10 May 65, 11p Rept. no. SR-65-2 Unclassified report

Descriptors: (*Naval training, Flight), (*Flight, Naval training), Instructors, Students, Naval personnel, Personality, Effectiveness, Psychology, Statistical analysis.

Military flying by its very nature is hazardous duty. Perhaps more than any other occupation, it demands a complete dedication on the part of its personnel. Because this is true, all training commands permit flight students to voluntarily resign from the program if they so desire. However, since voluntary withdrawal (DOR) carries with it a sizeable money and manpower loss, it is desirable to minimize its occurrence. One of the more obvious possible causes of DORing might be that some instructors possess personality traits that tend to discourage students. With this in mind, the present study seeks to determine if some flight instructors appeared to be involved in significantly higher DOR rates among their students than did other instructors. DOR data, as related to individual flight instructors in Naval primary flight training over a two-year period, were collected and analyzed statistically. A chi-square test was used to determine whether or not the DORs occurring in this period were distributed among flight instructors as we would theoretically expect them to be by chance. Results indicate that no instructor or any identifiable group of instructors experienced more than a normal share of the DORs. This is not evidence, however, that there is no importance to the student-instructor relationship. It is evidence that indices other than number of DORs must be used to explore this relationship. (Author)

AD-619 249 Div. 30/1, 2/1, 25/4, 25/2, 4/4, 2/4
CFSTI Prices: HC$3.00 MF$0.75

Aerospace Technology Div., Library of Congress, Washington, D. C.
FOREIGN SCIENCE BULLETIN, 1965, VOL. 1, NO. 8.
Aug 65, 74p
TT 65-62893 Unclassified report

A monthly review of selected foreign scientific and technical literature sponsored by the Department of Defense.

Descriptors: (*Scientific research, Reviews), Periodicals, Government(Foreign), Radio astronomy, Telescopes, Lasers, Solar flares, Manned spacecraft, Life support, Epitaxial growth, Aluminum compounds, Nitrides, Films, Satellites(Artificial), Polymers, USSR.

Contents: Giant radio telescope; Raman scattering lasers; Forecasting solar flares; The second 'Man-in-Space' symposium and problems of Voskhod-2 life support systems; Epitaxial growth of aluminum nitride thin films; Computer monitoring of physiological conditions in space flight; A system of growth equations and some other dynamic systems used in biological modeling; The use of digital computers in processing geophysical data; A new method, based on the hall effect, for measurements of frequencies; Extravehicular activity in near-earth orbit; Recent developments in Soviet electronic distance-measuring instruments; Hungarian geodetic instruments; Fine structure of the solar magnetic field and conditions conducive to solar flare formation; Polar magnetic perturbations caused by a local electric field; International conference on laser research; Observation of artificial earth satellites; Conference on celestial mechanics; Problems in the theory of probability and mathematical statistics; Symposium on the status of investigations of the physical properties of rocks; Symposium on exchange processes in the boundary layers of the atmosphere and the hydrosphere; Polymer conference.

AD-619 302 Div. 23/5
CFSTI Prices: HC$1.00 MF$0.50

Naval School of Aviation Medicine, Pensacola, Fla.
PERFORMANCE IN THE PRE-FLIGHT WATER SURVIVAL COURSE AS A PREDICTOR OF SUCCESS IN FLIGHT TRAINING.
Special rept.,
by Charles W. Hutchins, Jr. and Richard S. Pomarolli.
4 Jun 65, 13p
Rept. no. SR-65-3
Unclassified report

Descriptors: (*Naval training, Pilots), (*Survival, Naval training), Flight, Physical fitness, Swimming, Performance(Human), Students, Statistical analysis, Correlation techniques.

The water survival course grades of 1300 Pre-Flight students were analyzed to determine the utility of these grades as predictors of eventual completion or failure in the flight training program. The Wherry-Doolittle method of test selection was used to evaluate two performance measures from the course: Mid-Course grade and the Swin-Hold status. Results indicate that both these measures make small but statistically significant contributions to the validity of the multiple predictor. There is evidence that the value of the water survival course as a predictor derives more from a student's initial ability as a swimmer than from his progress in the course. (Author)

AD-619 315 Div. 23/4
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
MAN TRAINING FOR THE COSMOS.
28 Jul 65, 12p Rept. no. FTD-TT-65-455
TT 65-62920
Unclassified report

Unedited rough draft trans. of Sovetskii Voin (USSR) v47 n6 p10-2, 37-40 1965.

Descriptors: (*Astronauts, Training), (*Space flight, Training), USSR, Space medicine, Rotation, Space environmental conditions, Simulation, Adaptation-(Physiology), Centrifuges.

AD-619 337 Div. 32/8 18/4
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
AGAINST WAR, FOR PEACE.
Jun 65, 6p Translation-1397
TT 65-62943
Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v41 n7 p3-5 1964.

Descriptors: (*Warfare, History), Disarmament, Underground explosions, Tests, Thermonuclear reactions, Foreign policy, Economic warfare, USSR.

Arguments are given for the discouragement of a thermonuclear war and for the attainment of that national independence and security under which peace is possible. The article was written in 1964, the 50th anniversary of World War I and the 25th of World War II, giving an occasion for recounting the horrors of war.

AD-619 345 Div. 32/3, 30/2, 31/5
CFSTI Prices: HC$3.00 MF$0.75

David Taylor Model Basin, Washington, D. C.
PROJECT SHARP (SHIPS ANALYSIS AND RETRIEVAL PROJECT) COMPUTER ASPECTS AND PROGRAMS.
Interim rept. for Oct 63-Oct 64,
ed. by Annie E. Cooper and Gilbert R. Gray.
Jun 65, 88p Rept. no. 1923
Proj. SF007 01 03, Task 0404 Unclassified report
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Naval research, Documentation), (*Computers, Information retrieval), (*Information retrieval, Naval research), (*Libraries, Naval research), Digital computers, Vocabulary, Programming(Computers), Bibliographies, Inventory control, Periodicals, Data storage system, Search theory, Reports, Ships.

SHARP is a computer-oriented information storage and retrieval system developed to resolve some of the problems inherent in the handling, storage, and retrieval of scientific and technical literature at the Bureau of Ships Technical Library. The computer is being used to automate to a high degree (1) bibliographic searches, (2) subject matter searches, (3) coordinated searches (combinations of both), (4) issuance of library catalog cards and accessions bulletins, (5) control of periodicals and journals, and (6) other aspects under development such as complete automatic generic computer searching, automatic posting of descriptive terms by the computer in the indexing procedure, and user interest registers. The system is intended to improve the library's capacity to better serve the user and to function as a management and logistics tool for the library. Details of the computer aspects of the indexing scheme, search strategy, thesaurus, computer programs, present research work are reported. Modifications to the system and future plans are indicated. (Author)

AD-619 346 Div. 23/5, 28/4
CFSTI Prices: HC$3.00 MF$0.75

Personnel Research Lab. (6570th), Aerospace

Medical Div., Lackland AFB, Tex.
AQE NORMS FOR HIGH SCHOOL SENIORS AND AIR FORCE TRAINING GROUPS,
by Ernest C. Tupes. May 65, 89p
Rept. no. PRL-TR-65-10
Proj. 7717, Task 771705
Unclassified report

Descriptors: (*Aptitude tests, Students), (*Air force personnel, Selection), Air force training, Reliability, Recruiting.

The Airman Qualifying Examination (AQE) provides four aptitude indexes (General, Administrative, Mechanical, and Electronics) which are used in the selective recruiting and initial assignment of basic airmen. This report presents normative data for nationwide groups of 12th grade boys and 12th grade girls, and for groups of airmen assigned to technical training in the Air Force. Percentile distributions are presented for all 12th grade boys and all 12th grade girls by type of high school and/or curriculum, by region of the country, and, by size of city within each region. For those not entering college after high school graduation, percentile distributions are shown by region of the country and by city size within each region. For the Air Force technical school groups, percentile distributions are presented along with estimates of the probable success in training of airmen at each aptitude index level. (Author)

AD-619 349 Div. 32/8
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
THE RISE AND FALL OF AFRO-ASIAN SOLIDARITY,
by Guy J. Pauker. Aug 65, 15p
Rept. no. P-3190
Unclassified report

Descriptors: (*Asia, Political science), (*Africa, Political science), United Nations, Cold war, Foreign policy, Communism.

The postponement of the Second Afro-Asian Conference is discussed in terms of its political significance. The author concludes that the decision to postpone the meeting was a clear victory for the moderate elements in the Afro-Asian world. While Communist China and Indonesia suffered a major diplomatic defeat, the Soviet Union gained indirectly by avoiding an unpredictable test of strength. India quietly asserted again the leading role it had seemingly lost in recent years, and solidarity among African and Asian countries on the basis of past membership in the imperial systems of the West proved surprisingly strong. The question that remains is whether in the light of their experience in Algiers, the new nations will realize that the United Nations, despite its inherent weaknesses, is for them a better meeting ground than spurious 'solidarity meetings' prometed by radical demagogues.

AD-619 353 Div. 32/8, 28/5

Harvard Univ., Cambridge, Mass.
FROM FRIENDSHIP TO COMRADESHIP: THE CHANGE IN PERSONAL RELATIONS IN COMMUNIST CHINA,
by Ezra F. Vogel. 1964, 17p
Contract AF49 638 1399, Proj. 9748, Task 974801
AFOSR 65-0977 Unclassified report
Pub. in China Quarterly n21 p46-60 Jan-Mar 1965
(Copies available only to DDC users).

Descriptors: (*Communism, China), (*Social psychology, Communism), Behavior, Fear, Social communication, Verbal behavior, Inhibition, Reasoning, Political science.

In communist China, personal friendship has been replaced by comradeship, a universalistic ethic which regards all persons as equal under the state. This ethic is necessary to this modernizing society, because it reduces the threat to political control and because it provides a basis of personal relations which makes it possible for persons from different social backgrounds, different geographical areas, and different likes and dislikes to have relationships with each other. The people conform to comradeship largely from fear of being accused or exposed as a threat to national goals by friends or acquaintances. (Author)

AD-619 373 Div. 30/1, 8/7, 15/1
CFSTI Prices: HC$3.00 MF$0.75

HRB-Singer, Inc., State College, Pa.
TOWARD A GENERAL METHODOLOGY FOR SYSTEMS EVALUATION,
by Gene A. Markel. Jul 65, 73p
Rept. no. 352-R-13
Contract Nonr381800
Unclassified report

Descriptors: (*Systems engineering, Theory), Operations research, Communication theory, Bibliographies.

The paper attempts to establish a generalized approach to systems evaluation. A fundamental perspective on systems evaluation is formulated by applying the rudimentary principles of evaluation to the system concept. Systems may be evaluated on the basis of their structural, operational or performance characteristics. A modular approach is recommended as most valid and practical for general systems evaluation. The modular concept is employed to establish requirements for the evaluation of intelligence systems and some applicable modeling concepts are described. An annotated bibliography of some literature related to systems evaluation is included as an appendix. (Author)

AD-619 380 Div. 23/4
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
OPPORTUNITIES AND OBLIGATIONS,
by F. R. Collbohm. Jun 65, 9p Rept. no. P-3200
Unclassified report

Commencement Exercises 6 Jun 65, Harvey Mudd College, Claremont, Calif.

Descriptors: (*Education, Scientific personnel).

AD-619 389 Div. 28/1, 32/9
CFSTI Prices: HC$2.00 MF$0.50

Bureau of Social Science Research, Inc., Washington, D. C.
FEAR AND ENTHUSIASM IN SPORT PARACHUTING,
by Samuel Z. Klausner. May 1965, 35p
Contract AF49 638 992
AFOSR 65-1329
Unclassified report

Prepared for inclusion in Motivations in Sports by Ralph Slovenko and James A. Knight to be published by Charles C. Thomas, Springfield, Illinois.

Descriptors: (*Parachute jumping, Recreation), (*Fear, Parachute jumping), Emotions, Motivation, Attitudes, Personality, Psychometrics, Social sciences, Analysis of variance, Statistical data.

Replies to a mail questionnaire by 825 sport parachutists affiliated with 103 parachute clubs are the data of this study. Questionnaires were administered by officials of the individual clubs and asked about the experience of fear and enthusiasm, personal and social characteristics of the parachutists, attitudes relevant to sport parachuting, and included the Ma and Hy scales from the MMP1, a Draw-A-Person Test, and four story-stimulus pictures of parachuting situations. Only the jump experience, an analysis of the stories told about one picture, and a few social characteristics are reported in this paper.

AD-619 392 Div. 28/5
CFSTI Prices: HC$1.00 MF$0.50

Rutgers - The State Univ., New Brunswick, N. J.
A COMPENDIUM OF MEASURES OF INDIVIDUALS, GROUPS AND ORGANIZATIONS RELEVANT TO THE STUDY OF ORGANIZATIONAL BEHAVIOR.
Research memorandum,
by Bernard P. Indik. Jul 65, 7p

Contract Nonr40410

Unclassified report

Descriptors: (*Group dynamics, Behavior), Research program administration, Social psychology, Measurement, Classification, Reliability.

An attempt is being made to classify measures of variables that have been used in the past to measure individuals in groups which are embedded in organizational settings which themselves are in a sociocultural environment. This listing of measures is organized by the classification scheme developed earlier, (Indik, 1963) and more recently modified (Indik, 1965). A compendium of information is being prepared with reference to each measure of each variable (individual, group or organizational) in order to make available the pertinent data (or lack thereof) as to the adequacy of information with reference to the reliability and the validity of the measures of these variables. The size of the first printing of the compendium will be dependent on the expressed interest and demand that is shown for the report.

06. Biological and Medical Sciences

AD-618 700 Div. 16/3

Ohio State Univ., Columbus.
STUDIES ON GANGLIOSIDES FROM HUMAN AND CALF BRAIN.
Doctoral thesis,
by Ronald Jack Penick. 1965, 80p
Unclassified report

Available only for reference use at DDC field services. Copy is not available for public sale.

Descriptors: (*Brain, Fatty acid esters), (*Fatty acid esters, Chromotographic analysis), Quantitative analysis, Glucose, Amides, Fatty acids, Glycosides, Alcohols, Carbohydrates, Neuraminic acids, Hexoses, Tissue extracts.

Attempts to characterize the individual gangliosides by component molar ratios have indicated a requirement for reliable glucose and galactose assays at the sub-milligram level. An investigation was undertaken to develop analytical procedures to meet these requirements. The study resulted in the development of a new gas-liquid chromatographic method which was suitable for the simultaneous quantitative analysis of glucose and galactose from sub-milligram amounts of ganglioside. When this GLC assay was used to characterize a preparation which appeared to be an unreported ganglioside, the data suggested that it was a mixture even though the TLC assay of the preparation indicated that it was homogeneous. Subsequently, it appeared from a study of the most recent literature that no single TLC solvent system was adequate to distinguish the numerous ganglioside species which were reported. Therefore, it was decided to investigate the TLC properties of all the available ganglioside preparations in four commonly used solvent systems. The data are compared to those reported in the literature. It is anticipated that these studies will result in a more complete understanding of the chamical nature of the individual gangliosides.

AD-618 715 Div. 29/6, 16/15
CFSTI Prices: HC$2.00 MF$0.50

Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
ACOUSTICAL EVALUATION OF X-20A DYNA-SOAR FULL-PRESSURE SUIT ASSEMBLIES.
Final rept.,
by Henry C. Sommer and Harald K. Hille. May 65, 30p Rept. no. AMRL-TR-65-86
Proj. 7231, Task 723103
Unclassified report

Descriptors: (*Pressure suits, Acoustic properties), (*Astronauts, Auditory perception), Helmets, Noise, Sound transmission, Attenuation, Training, Flight clothing, Exposure suits, Auditory signals, Spacecraft cabins, Earphones, Microphones, Communication equipment, Boost-glide vehicles.

Data on the subjective Real-Ear Attenuation at Threshold (REAT) and noise transmission measurements at the helmet microphone and ear cup were obtained for two models of the suit assembly. The first models tested and evaluated were called the 'training' models and were custom fitted for each of the Dyna-Soar pilots. During the test program, in which the pilots were acting as experimental subjects, the X-20A program was cancelled and only four of the six pilots completed the tests. The results of this evaluation revealed that various features of the assembly were unsatisfactory; therefore, an improved version was fabricated to correct the undesirable deficiencies. From the acoustical standpoint, the assembly was redesigned to eliminate a resonance at 250 cps with the visor open. This improved second model was called the 'flight ready' model. The report describes a comparative acoustical evaluation of the training models and flight-ready models of the suit assemblies. Evaluation consisted of (1) the subjective measurement of Real-Ear Attenuation at Threshold (REAT) and (2) the measurement of transmission loss through the helmet at the helmet microphone and ear cup position.

AD-618 717 Div. 16/2, 16/4, 16/3, 16/11, 16/1
CFSTI Prices: HC$3.00 MF$0.75

Institute of Contemporary Russian Studies, Fordham Univ., New York.
SOVIET BIOMEDICAL JOURNALS: INDEX TO SELECTED ABSTRACTS, SERIES II, NOS. 1-6,
ed. by W. C. Jaskievicz. Jun 65, 68p
Contract DA18 108 405CML867A
TT 65-62789
Unclassified report

Descriptors: (*Medical research, Indexes), (*USSR, Medical research), Periodicals, Abstracting, Subject indexing, Bibliographies, Microbiology, Diseases, Pharmacology, Biology, Biochemistry, Physiology, Medical personnel, Scientific personnel, Medical laboratories, Biological laboratories.

The report includes the following: (1) An Index of Subjects mentioned in the bibliographies and Abstracts of Series II of the Selected Abstracts; (2) An Index of Persons who were mentioned in the Abstracts as authors or scientific contributors; (3) An Index of Soviet and other biomedical institutes and facilities from which the original material originated or which were mentioned in the course of the original article; and (4) An Index of Geographical Places mentioned in the Abstracts.

AD-618 754 Div. 16/4, 16/2
CFSTI Prices: HC$2.00 MF$0.50

Arizona Univ., Tucson.
THE SPECIFICITY OF THE SLIME FLUX OF MESQUITE FOR THE YEAST CRYPTOCOCCUS NEOFORMANS.
Master's thesis,
by Neil C. Westerlund. 1965, 45p
Unclassified report

Descriptors: (*Trees, Yeasts), (*Yeasts, Infections), Plant tissue, Culture media, Growth, Tissue fluids, Insects.

Cryptococcus neoformans was isolated from 7% of 58 slime flux samples from mesquite (Prosopis juliflora) but not from the slime flux of Mexican blue oak (Quercus oblongifolia), scrub oak (Quercus emoryii), cottonwood (Populus fremontii) or saguaro (Cereus giganteus). Cryptococcus neoformans was also found in 3.3% of 90 mesquite bark samples and in 9% of 22 mesquite twigs but not in leaves, flowers, pods or sap. It was never encountered in cultures of 238 insects, 10 bird dung samples or the intestinal contents of 3 lizards. Growth of Cryptococcus neoformans occurred in Czapek's solution and nutrient broth only when extracts of mesquite slime flux or extracts made from mesquite plat parts were added. Growth did not occur in these media when extracts made from the other desert plants were added. A temporary inhibition of growth of Cryptococcus neoformans was produced by an extract of cottonwood flux but not by that of any other plants studied. It was not found possible to establish infection by inoculation of the yeast into the slime flux of desert plants including mesquite. (Author)

AD-618 755 Div. 16/3
CFSTI Prices: HC$1.00 MF$0.50

Applied Science Labs., Inc., State College, Pa.
PHYSICAL AND CHEMICAL CHARACTERISTICS OF HIGH pH INTRALIPID FAT EMULSIONS.
Rept. for 1 Nov 64-1 Jul 65,
by Nicholas Pelick, John H. Tinker, and Joseph M. Steim.
1 Jul 65, 18p
Contract DA49 193MD2155

Unclassified report

Descriptors: (*Parenteral infusions, Lipids), (*Fats, Colloids), (*Lipids, pH), Blood serum, Oils, Chromatographic analysis, Hydrolysis, Fatty acids, Alcohols, Organic phosphorus compounds, Amino acids, Colorimetric analysis, Physical properties, Chemical properties.

Intralipid intravenous fat emulsions, that were purposely prepared to have high pH, were broken down into oil and water phases. The neutral and polar lipids and water soluble materials were examined by chromatographic procedures. Extreme differences were found in two different bottles from the same batch. Products of hydrolysis such as free fatty acids, lysolipids, free glycerol, alpha-glycerol phosphate and amino acids were detected. All of the analytical work was done using various thin-layer and paper chromatographic methods. Identifications were made with authentic standards and colorimetric chromogenic reagents. Rapid changes in pH were shown to occur as time passed. (Author)

AD-618 758 Div. 16/9, 16/1, 16/3

Lobund Inst., Univ. of Notre Dame, Ind.
IRON, COPPER, AND MANGANESE IN GERMFREE AND CONVENTIONAL RATS,
by B. S. Reddy, B. S. Wostmann, and J. R. Pleasants.
18 Dec 64, 11p
Contract Nonr162300; Grant PHS HD00855

Unclassified report

Pub. in Journal of Nutrition v86 n2 p159-68 Jun 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Germ-free animals, Metabolism), (*Iron, Metabolism), (*Copper, Metabolism), (*Manganese, Metabolism), Blood serum, Hemoglobin, Liver, Spleen, Kidneys, Rats.

The effects of the microflora on the metabolism of iron, copper, and manganese were studied using germfree and conventional rats of both sexes. Hemoglobin and hematocrit values were similar in both groups, whereas plasma iron and copper levels were slightly but significantly lower in germfree than in conventional rats. The liver of the germfree rat stored more iron than that of the conventional rat, but the spleen, kidneys, and the total body of the germfree rat contained less iron than those of the conventional animal. As expected, the iron levels in females were higher than in males in both experimental groups. The relative proportions of ferritin and hemosiderin iron in the various organs of germfree and conventional rats were comparable. The levels of copper in these organs and in the total body followed the same pattern as the iron levels in germfree and in conventional rats. In contrast with the observations on iron and copper, the concentrations of manganese in the above mentioned organs and in the total body were similar in germfree and conventional rats. The results suggest a lower rate of iron and copper metabolism and a similar rate of manganese metabolism in germfree rats as compared with conventional rats. (Author)

AD-618 760 Div. 16/10, 16/2

Lobund Inst., Univ. of Notre Dame, Ind.
PROTECTION INDUCED BY BACTERIAL ENDOTOXIN AGAINST WHOLE-BODY X-IRRADIATION IN GERM-FREE AND CONVENTIONAL MICE,
by G. David Ledney and Raphael Wilson. 4 Sep 64, 4p
Grant PHS RH00239 01

Unclassified report

Pub. in Proceedings of the Society for Experimental Biology and Medicine v118 p1062-5 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Toxins + antitoxins, Radioprotective agents), (*Radioprotective agents, Toxins + antitoxins), Whole body irradiation, X rays, Escherichia coli, Enterobacteriaceae, Immunity, Radiological dosage, Lethal dosage, Mice.

When conventional and germ-free mice are administered 10 micrograms of E. coli endotoxin intraperitoneally 24 hours prior to whole-body X-irradiation, the LD50(30) X-ray dose is raised to about the same degree for both groups: from 739 r to 829 r for conventional mice and 834 r to 942 r for germ-free mice. For both groups the X-ray dose-reduction factors lie in the narrow range of 1.13 to 1.15. (Author)

AD-618 763 Div. 16/15, 28/3

Columbia Univ., New York.
THE DETERMINATION OF SOME VISUAL FUNCTIONS OF A UNILATERALLY COLOR-BLIND SUBJECT: METHODS AND RESULTS,
by C. H. Graham, H. G. Sperling, Y. Hsia, and A. H. Coulson. 8 Aug 60, 32p
Proj. NM22 01 20

Unclassified report

Pub. in Journal of Psychology v51 p3-32 1961
(Copies not available to DDC or Clearinghouse customers)
Prepared in cooperation with Naval Medical Research Lab., New London, Conn.

Descriptors: (*Color vision, Thresholds(Physiology)), Vision, Spectroscopy, Luminescence, Colors, Mixtures, Visual perception, Sensitivity, Spectra(Visible + ultraviolet), Eye, Psychophysiology.

Experiments were performed on a young woman whose right eye exhibits normal color vision and whose left eye is dichromatic. The normal eye gives color mixture curves that are similar to those given by normal subjects. In her dichromatic eye, she can match any wavelength in the spectrum with a combination of two primaries, 460 millimicrons and 650 millimicrons. The normal eye does not show defective hue discrimination. Hue discrimination thresholds in her color-blind eye are generally raised above their values in the normal eye. However, in the violet below 440 millimicrons, her hue discrimination is better than it is in the case of the usual deuteranope. The subject name the colors that she saw with her dichromatic eye in terms of colors she saw in her normal eye. Wavelengths below the neutral point (which occurs at about 502 millimicrons) in her color-blind eye are called blue; above the neutral point they are called yellow. At and near the neutral point they are called grey. Data on binocular color-matching support the results of color naming. The subject's dichromatic eye sees only two colors in the spectrum: a blue equivalent to 470 millimicrons viewed in her normal eye for wavelengths below the neutral point, and a yellow equivalent to about 565 millimicrons for wavelengths above the neutral point. (Author)

AD-618 764 Div. 16/10, 16/2

Lobund Inst., Univ. of Notre Dame, Ind.
THE INTESTINAL MUCOSA OF GERMFREE MICE AFTER WHOLE-BODY X-IRRADIATION WITH 3 KILOROENTGENS,
by Taiju Matsuzawa and Raphael Wilson. 21 Aug 64, 10p
Grant PHS RH00239 01
Unclassified report

Pub. in Radiation Research v25 n1 p15-24 May 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Intestines, Whole body irradiation), (*Whole body irradiation, Intestines), X rays, Membranes(Biology), Mucus, Radiological dosage, Lethal dosage, Histology, Cells(Biology), Connective tissue, Life span, Microorganisms, Mice.

Germfree CFW mice exposed to 3 kR of whole-body X-irradiation have a mean survival time of 7.3 days, whereas conventional CFW mice under the same conditions have a mean survival time of 3.5 days. The increased survival time in germfree mice is ascribed to the longer life span of mucosal cells. The migration of epithelial cells from crypt to villus tip takes 4.3 days in germfree mice and 2.1 days in conventional mice. After 3 kR, the intestine is denuded in 3.5 days in conventional mice and not until 7 days in germfree mice. Death occurs very soon after denudation in both groups. (Author)

AD-618 765 Div. 16/10

Retina Foundation, Boston, Mass.
PATHOLOGICAL ANATOMY OF COMPLICATIONS,
by Milton Boniuk and Lorenz E. Zimmerman. 1965, 50p
Unclassified report

Pub. in Controversial Aspects of the Management of Retinal Detach p263-312 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Eye, Pathology), (*Retina, Surgery), Ophthalmology, Neoplasms, Necrosis, Wounds + injuries, Cornea, Histology, Diagnosis.

A number of papers in the recent literature have been concerned with various aspects of the pathogenesis of retinal detachment. Little has been written, however, about the pathological anatomy of the eye after operations for reattachment of the retina. In this report, therefore, summarized observations made in a study of 204 eyes enucleated after one or more such operations are presented.

AD-618 766 Div. 16/1

School of Aerospace Medicine, Brooks AFB, Tex.
ADRENAL FUNCTION DURING BED REST,
by Fred H. Katz. 1963, 3p
Unclassified report

Pub. in Aerospace Medicine v35 n9 p849-51 Sep 1964
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Corticosteroid agents, Secretion), Adrenal glands, Adrenal cortex hormones, Relaxation-(Physiology), Exercise, Rhythm(Biology), Blood plasma, Urine, Labeled substances, Tracer studies, Chromatographic analysis.

Plasma 17-OH-CS levels as well as adrenal secretory rates of aldosterone and cortisol were measured in healthy subjects before and during periods of bed rest. The circadian rhythm of plasma 17-OH-CS was well maintained during bed rest. There was no change in adrenal cortisol secretion rates during bed rest. Aldosterone secretory rate did not change with bed rest; however, following a period out of bed, there was a diminution of aldosterone secretory rate during a subsequent bed rest period. Inactivity from bed rest therefore does not appear to change adrenal cortisol production. Conclusions cannot be drawn as yet concerning aldosterone production. (Author)

AD-618 769 Div. 16/1

School of Aerospace Medicine, Brooks AFB, Tex.
HYPOXIA, AN ANTI-DECONDITIONING FACTOR FOR MANNED SPACE FLIGHT,
by Lawrence E. Lamb. 1965, 4p
Unclassified report

Pub. in Aerospace Medicine v36 n2 p97-100 Feb 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Hypoxia, Acclimatization), (*Astronauts, Physical fitness), Space flight, Manned, Adaptation-(Physiology), Space medicine.

A problem area in manned space flight is deconditioning, caused by physical confinement and the decreased workload secondary to the absence of body weight. The syndrome of deconditioning results in a clinical picture of decreased biological activity manifested by numerous well documented physiological adjustments. A large number of the physiological alterations noted in deconditioning are exactly the opposite of those induced by hypoxia. In this paper a brief review is presented of the differences between the syndrome of deconditioning and the syndrome of acclimatization induced by prolonged hypoxia, thereby suggesting a means of counteracting at least a portion of the problems of deconditioning. (Author)

AD-618 775 Div. 16/10, 16/11

Naval Submarine Medical Center, Groton, Conn.
Medical Research Lab.
CONSERVATIVE, NON-SURGICAL MANAGEMENT OF APPENDICITIS,
Interim rept.,
by Bruce H. Rice. 3 Apr 64, 24p
Rept. no. 444; Vol. 23/No. 26
Proj. MR005 14 3002 4
NAVMED MR005.14-3002-4.19
Unclassified report

Pub. in Military Medicine v129 n10 p903-20 Oct 1964
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Military medicine, Submarine personnel), (*Submarine personnel, Surgery), Abdomen, Pathology, Medical examination, Diagnosis, Therapy, Antibotics, Chemotherapeutic agents, Parasympatholytic agents, Parenteral infustions, Statistical data, Medical personnel.

The report discusses recommended management of suspected acute appendicitis in the young, healthy, male patient in an isolated military situation without proper surgical, anaesthetic, laboratory, pathologic, or radiologic facilities. Thirteen detailed cases from Fleet Ballistic Missile submarines are presented, as well as a review of 547 cases from the literature of conservative, non-surgical management of appendicitis. The discussion is directed primarily toward the medical officer on patrol on a nuclear-powered submarine, or serving in other isolated military situation, but the emphasis on conservative management is recommended even more vigorously for the independent-duty hospital corpsman. (Author)

AD-618 784 Div. 16/15

Eye Research Foundation, Bethesda, Md.
LETTER TO THE EDITOR. INDEPENDENCE AND INTERDEPENDENCE IN ON AND OFF VISUAL STIMULI,
by R. H. Peckham, W. H. Hart, and J. K. Peckham.
Oct 62, 4p
Contract Nonr275000

Unclassified report

Pub. in Vision Research v3 p187-8 1963(Copies available only to DDC users).

Descriptors: (*Vision, Stimulation), (*Retina, Adaptation(Physiology)), Visual perception, Cornea, Amphibians.

It is concluded that the ON instant represents a discrete stimulus, and the OFF instant represents a new and also discrete stimulus. The plateaux of intensity between ON and OFF, between OFF and ON, or, as in these studies, between ON and ON, or OFF and OFF, are periods during which adaptation can be developed. 'Flicker' stimulation therefore becomes a mutual interaction between OFF and ON under conditions in which the OFF-ON interaction inhibits response of both stimuli, perhaps because the plateau period is too short, at the ambient luminance, to permit adaptation between the stimuli. Such an hypothesis has two advantages: (1) the sequellae of the corneal ERG response are presented in a very simple interpretation, although perhaps oversimplified; (2) the critical flicker frequency can be interpreted wholly as a reflection of retinal adaptation; that is, as a measure of either retinal metabolism or retinal health.

AD-618 785 Div. 16/4, 16/1

Arctic Inst. of North America, Washington, D. C.
CONTINUOUS PHYSIOLOGICAL MEASUREMENTS FROM UNRESTRAINED ARCTIC GROUND SQUIRRELS (CITELLUS PARRYI),
by G. Edgar Folk, Jr. and Mary A. Folk. 1964, 21p
Rept. no. ONR-299(1)
Contract Nonr113801, Proj. NR307 105

Unclassified report

Pub. in Annales Academiae Scientiarum Fennicae Series A, p159-73 1964 (Copies available only to DDC users). Prepared in cooperation with Iowa State Univ., Iowa City.

Descriptors: (*Rhythm(Biology), Hibernation), (*Hibernation, Rodents), (*Rodents, Artic regions), Mammals, Physiology, Recording systems, Body temperature, Electrocardiography.

Mammals which hibernate also possess the well-known day-night rhythms of sleep and wakefulness. These behavioral and physiological rhythms are referred to as circadian (about 24-hour) or daily rhythms. They are particularly important to the student of hibernation because they exist in one form or another during mammalian dormancy and thus they represent a biological process indendent of temperature. The present paper concerns the daily rhythms of the ground squirrels which live in continuous light in the Arctic. Most of the life of the Arctic population of this species is spent without any regular daily environmental clue which would control a daily pattern of sleep and wakefulness. In 1955 the author pointed out the need of making observations in the Arctic; but not until 1960 was the first work begun, an intensive and thorough study by Swade. In 1961 and 1962 the author recorded the rhythms of a series of Arctic mammals at Barrow, Alaska. Radio capsules were used so that not only could daily rhythms be registered from unrestrained animals but also evidence of semihibernation could be recorded. (Author)

AD-618 800 Div. 16/4

Tel-Aviv Univ. (Israel). Dept. of Zoology.
CONUS (MOLLUSCA, GASTROPODA) COLLECTED BY THE ISRAEL SOUTH RED SEA EXPEDITION, 1962, WITH NOTES ON COLLECTIONS FROM THE GULF OF AQABA AND THE SINAI PENINSULA,
by Alan J. Kohn. May 64, 7p
Contracts N62558 2985, N62558 3335

Unclassified report

Rept. no. 11, Israel South Red Sea Expedition, 1962. Research done in cooperation with Dept. of Zoology, Univ. of Washington, Seattle.
Pub. in Sea Fish. Res. Stat. Haifa, Bulletin n38 p54-9 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Gastropoda, Morphology(Biology)), Aquatic animals, Israel, Red Sea, Tables.

AD-618 802 Div. 16/11

Texas Univ., Galveston. Medical Branch.
EFFECT OF A CHEMICALLY DEPRESSED AMYGDALA ON THE BEHAVIORAL MANIFESTATIONS PRODUCED IN CATS BY LSD-25,
by Ernest S. Barratt and Sidney L. Pray. 18 Dec 64, 6p
Contract Nonr159806

Unclassified report

Pub. in Experimental Neurology v12 n2 p173-8 Jun 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Lysergic acids, Inhibition), Skeletal muscle relaxants, Cerebellum, Thresholds(Physiology), Dosage, Nervous system, Physiology, Convulsive disorders, Central nervous system, Behavior, Cats.

The drug, SQ 10,496, an experimental antidepressant, raised the threshold for electrically induced amygdaloid seizures. It also blocked or diminished the behavioral effects of LSD-25. The blocking effect of SQ 10,496 is related to neurophysiological mechanisms which are possible the bases for the behavioral effects obtained with LSD-25. (Author)

AD-618 821 Div. 16/4

Portland State Coll., Oregon.
A NEW SPECIES OF TREMATODE, PYCNOPORUS RAMSESI (LECITHODENDRIIDAE), FROM EGYPT AND NOTES ON P. ACETABULATUS LOOSS, 1899
by Ralph W. Macy. 1962, 7p
Grant NSF G14016
Task LHMR005 09 1450 2

Unclassified report

Pub. in Proceedings of the Helminthological Society of Washington v31 n2 p292-7 Jul 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Trematodes, Morphology(Biology)), Parasites, Bats, Intestines, Worms, Egypt.

A new species of trematode, Pycnoporus ramsesi, from the intestine of an Egyptian bat, Pipistrellus ruppelli ruppelli, is described. It is differentiated from other species of the genus by having paracecal vitellaria, and ventral sucker smaller than the oral sucker. Two other specimens of this genus from the same bat were tentatively identified as P. acetabulatus Looss. The body wall of both species was found to have an additional layer of non-cellular material separated

from the parenchyma cells by a membrane. The esophagus of both species contained numerous, fine, transverse fibers. A new key to Pycnoporus is presented and the genus is emended. (Author)

AD-618 822 Div. 16/4

Portland State Coll., Oregon.
LIFE CYCLE OF THE DIGENETIC TREMATODE PLEUROGENOIDES TENER (LOOSS, 1898) (LECITHODENDRIIDAE),
by Ralph W. Macy. 2 Feb 64, 6p
Grant NSF G14016
Task LHMR005 09 1450 2
Unclassified report

Pub. in Journal of Parasitology v50 n4 p564-8 Aug 1964(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Trematodes, Life cycle), Parasites, Larvae, Adults, Insects, Parasitic diseases, Infections, Vertebrates, Egypt.

Experimental demonstration of the life cycle in Egypt is reported and the various stages are described. The cercaria, a minute, virgulate larva, develops in sporocysts in Bithynia subdiella, penetrates the rectal wall of dragonfly nymphs (Trithemis annulata, Crocothemis erythraea, Anax imperator, and A. parthenope), and encysts in adjacent tissues. Adult trematodes were recovered from the intestine of a lizard (Chalcides ocellatus) 22 days after being fed metacercariae in nymphal tissue. Development almost to maturity was obtained in Rana mascereniensis but mice, hamsters, and chicks could not be infected. (Author)

AD-618 823 Div. 16/4

Rhode Island Univ., Kingston.
THE EXAMINATION OF SPECIES OF THE BOLETACEAE FOR ALKALOIDS,
by Leonard R. Worthen, Walter H. Snell, and Esther A. Dick. 25 Sep 64, 4p
Grants PHS MH06511 02, NSF G23605
Unclassified report

Pub. in Lloydia v28 n1 p44-7 Mar 1965 (Copies not available to DDC or Clearinghouse customers). Prepared in cooperation with Brown Univ., Providence, R. I. Dept. of Botany.

Descriptors: (*Fungi, Alkaloids), (*Alkaloids, Fungi), Pharmacology, Toxicity, Muscarine, Colorimetric analysis.

AD-618 828 Div. 16/1, 16/10

Army Medical Research Lab., Fort Knox, Ky.
LIMITING FACTORS INVOLVED IN CO2 PRODUCTION BY STARVED AND X-IRRADIATED STARVED YEAST CELLS,
by Edward Spoerl, R. J. Doyle, and M. E. Thompson. 4 Sep 64, 10p Rept. no. 632
Proj. 3A014501A71E
Tasks 3A014501A71E05, 3A014501A71E12
Unclassified report

Pub. in Journal of Cellular and Comparative Physiology v65 n2 p271-6 Apr 1965(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Radiation effects, Yeasts), (*Metabolism, Radiation effects), Carbon dioxide, Cells(Biology), Starvation, Phosphorus transferases, Glycolysis, Enzymes, Glucose, Synthesis, Carbohydrates, Saccharomyces, Radiobiology.

Studies of reduced CO2 production by starved yeast cells were carried out to localize the site limiting this process and responsible for a greater production by irradiated cells. Cell-free extracts prepared before and after starvation of cells, and from irradiated and unirradiated cells, showed similar hexokinase activity and produced similar amounts of CO2. These results demonstrated that rate limiting glycolytic enzymes did not decay during starvation, were not induced during a lag period in CO2 production which could be overcome by glucose incubation, and were not responsible for differences in CO2 production between irradiated and unirradiated cells. Possible limiting factors involved in these differences include glucose transport as a consequence of differential decay during starvation, restricted cofactor synthesis and an enzymic binding or compartmentalization. (Author)

AD-618 833 Div. 16/4

Georgia Experiment Station, Experiment.
PARAPHYSOIDS, PSEUDOPARAPHYSES, AND APICAL PARAPHYSES,
by E. S. Luttrell. 19 Aug 64, 11p
Grant NSF G10727
Unclassified report

Pub. in Transactions British Mycological Society v48 n1 p135-44 1965 (Copies available only to DDC users).

Descriptors: (*Fungi, Morphology(Biology)), Spores, Tissues(Biology), Ascomycetes, Basidiomycetes.

The distinct, vertical, paraphysis-like hyphae developing in the centrum of loculoascomycetes prior to the formation of asci are properly termed pseudoparaphyses. Although they originate as outgrowths from stromal cells at the apex of the locule, their tips usually intertwine or push into the underlying stroma at an early stage, and their growth may be largely intercalary. Pseudoparaphyses are not homologous with strands of interthecial tissue representing remnants of stromal tissue compressed between the expanding asci, and the term paraphysoid as applied indiscriminately to both types of structure is of doubtful usefulness. The downward-growing palisade of hyphae with free tips in the centrum of hypocreaceous fungi should be distinguished as apical paraphyses. (Author)

AD-618 839 Div. 16/4

Michigan State Univ., East Lansing.
STUDIES IN THE FERN GENUS CHEILANTHES SWARTZ. I. THE LEAF BLADE ANATOMY OF SOME SPECIES OF THE GENUS,
by I. W. Knobloch and P. A. Volz. 1963, 26p
Unclassified report

Pub. in Phytomorphology v14 n4 p508-27 Dec 1964 (Copies available only to DDC users).

Descriptors: (*Plants(Botany), Morphology(Biology)), Cells(Biology), Cell structure, Biology.

The anatomy of the ultimate segments of 35 species of the genus Cheilanthes is covered in this paper. All of these have been termed xerophytes or near xerophytes by various authorities. All of the species examined had large bulliform cells in the upper epidermis except C. meifolia, C. siliquosa and C. california. The lower epidermal cells are usually smaller than those of the upper layer but stomates are present in the former and

not in the latter. Chloroplasts are a regular feature of the epidermis in many species. The palisade parenchyma varies considerably from species to species. Some have typical, rectangular cells; in others the cells are scarcely longer than broad and in some the entire mesophyll is quite uniform. The generalizations of Marsh on American species and of Nayar on Indian species do not hold throughout the study. One of the striking features of many of the species, if not all, is the presence of H- or Y-shaped cells in the palisade region. The spongy mesophyll is usually loosely organized and the cells are armed. The bundles are concentric, endodermal sheath and pericycle are present and the xylem tracheids are always more numerous than the phloem sieve tubes. The false indusium is formed by the reflexed margins of the segments. The epidermises may merge or remain separated by mesophyll in the indusium. The reflexed edges may terminate in a flap of linearly-spaced cells or the flap may be absent. Anatomical study does not by itself seem to clarify any of the problems of relationship and speciation known to exist within this group. (Author)

AD-618 844 Div. 16/10, 16/1

Naval School of Aviation Medicine, Pensacola, Fla.
THE WOLFF-PARKINSON-WHITE SYNDROME AS AN AVIATION RISK,
by Raphael F. Smith. 1963, 8p Rept. no. NSAM-860
Unclassified report

Pub. in Circulation v29 May 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Cardiovascular diseases, Aviation personnel), (*Electrocardiography, Aviation personnel), (*Aviation medicine, Electrocardiography), Heart, Pathology, Anomalies, Diagnosis, Tables.

From the observations summarized on subjects studied, and from similar reports in the medical literature, the conclusion is reached that asymptomatic aviators and aviation candidates with the W-P-W anomaly could be allowed to continue in an unrestricted flying status but those with paroxysmal tachycardia should be permanently disqualified for duty involving the actual control of aircraft. The primary study group was a rigidly selected population, and the findings in this group cannot be freely applied to the general population. The conclusions from these data should, however, be applicable to other populations that are similar in composition. (Author)

AD-618 847 Div. 16/10

Armed Forces Inst. of Pathology, Army Medical Center, Washington, D. C.
EMBOLISM OF CENTRAL RETINAL ARTERY,
by Lorenz E. Zimmerman. 14 Jan 65, 5p
Grant PHS TG537903
Unclassified report

Pub. in Arch Ophthal v73 p822-6 Jun 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Retina, Embolism), (*Embolism, Retina), Eye, Pathology, Blindness, Arteries, Visual inspection, Heart, Diseases, Thrombosis, Ophthalmology, Cardiovascular diseases.

A case of sudden blindness due to embolism of the central retinal artery occurring in a patient hospitalized for treatment of a recent myocardial infarction is presented because the eyes became available for histopathologic study when the patient died 62 hours after onset. In addition to providing confirmation of the occlusion of the central retinal artery, microscopic examination revealed multiple small emboli in the ciliary and choroidal vessels. (Author)

AD-618 855 Div. 16/2, 16/3

Cincinnati Univ., Ohio. Dept. of Microbiology.
THE BIOSYNTHESIS OF BIOTIN IN MICROORGANISMS. I. THE PHYSIOLOGY OF BIOTIN SYNTHESIS IN ESCHERICHIA COLI,
by Chik H. Pai and Herman C. Lichstein. 17 Jul 64, 8p
Grant NSF G19578, Proj. NR103 555
Unclassified report

Pub. in Biochimica et Biophysica Acta v100 p28-35 1965 (Copies available only to DDC users).

Descriptors: (*Vitamin B complex, Biosynthesis), (*Escherichia coli, Vitamin B complex), Culture media, Excretion, Growth, Microorganisms.

The time course of biotin synthesis and the distribution of the vitamin were studied in Escherichia coli growing in biotin-free and biotin-supplemented media. In biotin-free media, biotin synthesis occurred at a maximum rate just prior to the onset of the logarithmic phase of growth with continuous excretion of the vitamin into the growth medium. The bound biotin levels of the cells varied depending on cultural conditions, but the content of intracellular free biotin was always the highest at an early incubation time. At the end of the logarithmic phase the majority of 'total' biotin synthesized was found extracellularly. However, the extent of overproduction of 'true' biotin, particularly in an enriched medium, was very small. In biotin-supplemented media, the time course of synthesis was completely different and the total amount of biotin synthesized varied inversely with the concentration of (+)-biotin present prior to the inoculation of bacteria . The inhibition of biotin synthesis was achieved only by (+)-biotin; other biotin vitamers had no effect. The results suggest that biotin synthesis is controlled by (+)-biotin. (Author)

AD-618 856 Div. 16/2, 16/3

Cincinnati Univ., Ohio. Dept. of Microbiology.
THE BIOSYNTHESIS OF BIOTIN IN MICROORGANISMS. II. MECHANISM OF THE REGULATION OF BIOTIN SYNTHESIS IN ESCHERICHIA COLI,
by Chik H. Pai and Herman C. Lichstein.
17 Jul 64, 7p
Grant NSF G19578, Proj. NR103 555
Unclassified report

Pub. in Biochimica et Biophysica Acta v100 p36-42 1965 (Copies available only to DDC users).

Descriptors: (*Vitamin B complex, Biosynthesis), (*Escherichia coli, Vitamin B complex), Enzymes, Physiology, Control, Chloramphenicol, Ultraviolet radiation, Inhibition, Amino acids, Culture media.

The mechanism of the physiological control of biotin synthesis in Escherichia coli by exogenous biotin has been studied under conditions where enzyme synthesis was inhibited by chloramphenicol or ultraviolet irradiation. The results of such studies suggest that the regulation of biotin synthesis occurs via repression rather than feedback. The experimental findings are discussed in relation to the control of vitamin and amino acid biosynthesis. (Author)

AD-618 857 Div. 16/2, 16/3

Cincinnati Univ., Ohio. Coll. of Medicine.
THE BIOSYNTHESIS OF BIOTIN IN MICROORGANISMS. III. THE BIOSYNTHESIS OF (+)-BIOTIN FROM DESTHIOBIOTIN AND ITS CONTROL IN ESCHERICHIA COLI,
by Chik H. Pai and Herman C. Lichstein. 17 Jul 64, 7p
Grant NSF G19578, Proj. NR103 555

Unclassified report

Pub. in Biochimica et Biophysica Acta v100 p43-9 1965 (Copies available only to DDC users).

Descriptors: (*Vitamin B complex, Biosynthesis), (*Escherichia coli, Vitamin B complex), Culture media, Growth, Mutations, Glucose.

The conversion of desthiobiotin to (+)-biotin by Escherichia coli has been studied. Desthiobiotin is converted to (+)-biotin, as identified by bioautography by both growing and resting cells of a biotinless mutant strain of E. coli. The conversion is also demonstrable in resting cells of a wild-type strain of E. coli. No converting activity was found in either the mutant or wild-type strains which had been grown in the presence of exogenous (+)-biotin. Oxybiotin and desthiobiotin did not cause such repression. The results are in agreement with previous findings that biotin synthesis from glucose is repressed by (+)-biotin, and supports the role of this converting step as the functioning biosynthetic route to the vitamin. (Author)

AD-618 859 Div. 16/9, 16/3, 16/2

Lobund Inst., Univ. of Notre Dame, Ind.
SERUM PROTEINS OF GERM-FREE RATS FED WATER-SOLUBLE DIETS,
by B. S. Wostmann, G. B. Olson, and J. R. Pleasants. 1964, 4p
Grants HD00855, GB1105

Unclassified report

Pub. in Nature v206 n4988 p1056-7 Jun 5 1965 (Copies available only to DDC users).

Descriptors: (*Blood proteins, Immunity), (*Immunity, Blood proteins), Diet, Nutrition, Gamma globulin, Reticulo-endothelial system, Antigens + antibodies, Electrophoresis, Pyrogens, Bacteria, Rats, Guinea pigs.

The report presents data on serum proteins of germ-free rats fed a chemically defined, water-soluble 'antigen free' diet which was filter-sterilized. This type of diet, composed almost entirely of low-molecular-weight compounds and free of material of bacterial origin, should further reduce the level of reticuloendothelial system activity because of the absence of stimulation caused by high-molecular-weight substances and by killed and disintegrated microbial agents. The results indicate that, although most of the reticuloendothelial system stimulating material presumably occurring in the heat-sterilized solid-type diet is obviously absent in the filter-sterilized water-soluble formula, little if any further reduction in gamma-globulin levels is seen in germ-free rats fed this diet. Data obtained from germ-free guinea-pigs have demonstrated the strong reticulo-endothelial system stimulating effect of certain solid diets. It is possible that this effect of solid diets is much less noticeable in the germ-free rat.

AD-618 860 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
GENETIC RECOMBINATION IN INTESTINAL BACTERIA. III. STUDY OF THE GENETIC STRUCTURE OF DYSENTERY BACILLUS HYBRIDS (SEROLOGICAL PROPERTIES),
by A. A. Abidov. Aug 64, 7p Translation-1154
TT 65-62794

Unclassified report

Trans. of Byulleten' Eksperimental'noi Biologii i Meditsiny (USSR) v56 n9 p76-80 1963.

Descriptors: (*Enterobacteriaceae, Genetics), Bacillus, Dysentery, Antigens + antibodies, Immunity, Shigella flexneri, Escherichia coli, Immune serums, Biochemistry, USSR.

AD-618 862 Div. 16/4
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
THE IMPORTANCE OF BIRDS IN THE SETTLEMENT OF FLEAS (SUCTORIA) AND TICKS (IXODOIDEA) IN DAGESTAN,
by V. M. Gusev, A. A. Guseva, and P. A. Reznik. Jun 65, 4p Translation-1414
TT 65-62796

Unclassified report

Transl. of Meditsinskaya Parazitologiya i Parazitarnye Bolezni (USSR) v32 n6 p738-9 1963.

Descriptors: (*Birds, Parasites), (*Parasites, Birds), Siphonaptera, Ticks, Ecology, USSR.

During various seasons of 1952, 1954, 1956 and 1957 in the territory of the Dagestan ASSR in the Sulakski-Terskaya and Primorskaya lowlands (Dagestan plains) and also in the foothills, the authors investigated the presence of ectoparasites on 4156 birds (154 species) and also in 167 nests of 18 species of birds. All told 9292 ticks (Ixodiodea) and 1476 fleas (Suctoria) were collected and identified. Of the 68 species of fleas and 35 species of ticks residing in Dagestan (Shatas, 1957), 12 species of fleas and 16 species of ticks were identified on birds. Based on the nature of their bond with the birds, these ectoparasites can be united in four groups: First - specific ectoparasites of birds (fleas -- C. gallinae tribulis, C. fringillae, C. spinosus and F. frontalis alatau; ticks -- A. persicus, I. frontalis and I. berlesi); second -- ticks feeding on birds primarily in immature phases (I. ricinus, H. sulcata, H. punctata, H. otophila, H. plumbeum); third -- ticks which feed on birds in the adult stages more often than in the immature phases (I. redikorzevi, R. sanguineus, R. turanicus); fourth -- fleas and ticks, not feeding on birds; their presence on the birds is accidental (fleas -- P. irritans, S. insperata, C. tesquorum, C. consimilis, C. laevicips, F. semura, M. eucta tuschkan, N. setosa and the ticks -- D. marginatus, D. daghestanicus, R. pumilio, R. burs, R. rossicus). (Author)

AD-618 863 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
STABILIZATION OF THE IMMUNOGENIC PROPERTIES OF THE GIRARD AND ROBIK EV STRAINS,
by E. I. Korobkova, V. N. Lobanov, and O. R. Kuznetsova. Aug 64, 11p Translation-1149
TT 65-62797

Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v41 n2 p16-21 1964.
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Descriptors: (*Vaccines, Immunity), Bacteria, Antigens + antibodies, Dosage, Injection(Medicine), Parenteral infusions, Stabilization, Culture media, Guinea pigs, USSR.

Conclusion: Repeated passage through guinea pig conjunctiva or subcutaneous and intraperitoneal administration of diminishing doses of EV strain culture provided for enhancement and stabilization of the immunogenicity of the strain. The passage methods used did not lead to more intense virulency and reactogenicity of the EV strain; experiments in animals and pathohistological investigations confirmed its initial innocuousness. In undertaking passages a culture isolated from a guinea pig sacrificed not later than the fifth to sixth day after inoculation should be used. Prolonged residence of the vaccine culture in the animal organism led to a significant decrease in its immunogenicity. Cultures obtained from individual colonies of the same strain, not differing in form, is different in immunogenicity. The method of studying individual colonies can be employed for selecting immunogenicity of EV strain subcultures. (Author)

AD-618 864 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
SOME GENERAL REGULARITIES IN THE FORMATION OF L-FORMS IN VARIOUS PATHOGENIC SPECIES OF BACTERIA,
by G. Ya. Kagan, S. V. Prozorovskii, E. I. Koptelova, A. G. Shchegolev, and V. T. Savenkova. 1963, 9p Translation-1050
TT 65-62798

Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v40 n11 p7-12 1963.

Descriptors: (*Bacteria, Mutations), Morphology-(Biology), Metabolism, Salmonella, Salmonella typhosa, Corynebacterium diphtheriae, Streptococcus, Staphylococcus aureus, Neisseria gonorrhoeae, Growth, Culture media, Viability, USSR.

Many pathogenic species of bacteria are capable of L-transformation. This capacity was more pronounced in the Gram-negative bacteria and less--in the Gram-positive ones. L-form production depended on the culturing conditions, the character of actions used and their intensity. With equal conditions there were strains within the range of the given species, possessing different capacity to L-transformation with a subsequent stabilization in L-form. L-form populations are heterogenic by their capacity to L-transformation. Along with the cells, which are relatively easily transformed into L-form under the effect of transforming agents, there occur cells with a limited capacity to L-transformation and nonviable ones, rapidly perishing in the given conditions. Stable L-forms are produced as a result of the primary reaction to the transforming action, or as a result of prolonged passage of various heteromorphic growth forms and of nonstable L-forms in conditions of the transforming agent action. Nonstable L-forms may be regarded as modifications. The mechanisms of the stable L-form production are still obscure; nevertheless there is basis for supposition concerning the mutation-selective process of L-transformation, in which the transforming agents induce the appearance of L-forms and simultaneously lead to the selection of the appearing L-mutants. (Author)

AD-618 865 Div. 16/11, 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
THE INFLUENCE OF STREPTOMYCIN ON THE EFFECTIVENESS OF EXPERIMENTAL IMMUNIZATION WITH LIVE VACCINES. REPORT II. ADMINISTRATION OF STREPTOMYCIN DURING IMMUNIZATION WITH TULAREMIA VACCINE,
by D. T. Khokhlov and S. M. Kirov. 1965, 10p Translation-1420
TT 65-62799

Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v41 n10 p17-22 1964.

Descriptors: (*Streptomycins, Immunity), (*Pasteurella, Vaccines), Dosage, Viability, Effectiveness, Corticosteroid agents, Sensitivity, Mice, USSR.

Conclusions: The administration of streptomycin in doses exceeding those usually used for the emergency prophylaxis of tularemia by 2 and 4 times (considering the weight of the animal) did not lower the resistance of white mice to subsequent infection during the carrying out of immunization with tularemia vaccine. For evaluating the immunogenicity of live tularemia vaccines in an experiment, it is possible to make use of the infection of white mice with vaccine tularemia strains. During this the administration of 5 mg of cortisone 4 hours prior to infection sharply increased the sensitivity of the white mice and created a very effective experimental model of tularemia infection. (Author)

AD-618 866 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
A METHOD FOR DETERMINING THE CONCENTRATION OF KILLED PERTUSSIS VACCINE IN THE AIR,
by F. G. Mayorova. 1965, 6p Translation-1051
TT 65-62800

Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v40 n11 p65-9 1963.

Descriptors: (*Bordetella pertussis, Bacterial aerosols), (*Bacterial aerosols, Colorimetric analysis), (*Vaccines, Respiration), Antigens + antibodies, Dosage, Air, USSR.

Conclusions: The method of the quantitative determination of pertussis bacilli in a suspension with the help of the complement fixation reaction is sufficiently sensitive and reliable. With this method it was possible to expose down to 250-500 million pertussis bacilli in 1 ml. For determining the concentration of pertussis bacteria in an experiment it is recommended to use the photocolorimetric method under the control of reactions which expose its specificity. The complement fixation reaction and the photocolorimetric method can be used for determining the concentration of pertussis bacilli in the air of a room and the extent of the inhaled dose of pertussis vaccine. (Author)

AD-618 867 Div. 16/2, 16/11
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
DETECTION OF BOTULIN TOXIN IN CANNED FOOD WITH THE HELP OF THE INDIRECT HEMAGGLUTINATION REACTION AFTER BOYDEN,
by G. A. Bayar. 1965, 4p Translation-1053

TT 65-62801

Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v40 n11 p142 1963.

Descriptors: (*Clostridium botulinum, Toxins + antitoxins), (*Food poisoning, Clostridium botulinum), Antigens + antibodies, Food, Immune serums, Toxicity, Mice, USSR.

The indirect hemagglutination reaction after Boyden with Konikova's modification was used with the aim of detecting botulin toxin in canned foods. Based on the results of the biological test, the activity of botulin toxin in the contaminated cans reached 1600-3200 Dlm in 1 ml for type A toxin and 320-640 Dlm in 1 ml for type B toxin. A conclusion concerning the presence of toxin may be made in 12-24 hours and concerning the degree of activity in 3-4 days. By using the indirect hemagglutination reaction in these tests it was possible to expose 1/6-1/64 Dlm of toxin in 1 ml in 1-11/2 hours after setting up the experiment. The method was considerably more sensitive and made it possible to obtain the results faster than by the biological test.

AD-618 868 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
CHANGES OF CONDITIONS OF EXISTENCE OF THE NATURAL TULAREMIA FOCUS IN THE NORTHERN AREA OF THE VOLGO-AKHTUBINSK FLOODPLAIN AREA IN CONNECTION WITH THE CONSTRUCTION OF THE VOLGOGRAD HYDROELECTRIC POWER STATION,
by N. G. Olsufev, V. V. Kucheruk, V. P. Borodin, V. G. Petrov, and G. P. Uqlovoi. 1962, 9p
Translation-1052
TT 65-62802

Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v40 n11 p127-32 1963.

Descriptors: (*Pasteurella tularensis, Immunity), (*Disease vectors, Pasteurella tularensis), Rodents, Ticks, Vaccines, Epidemiology, Ecology, Industrial plants, Rivers, USSR.

Considerable changes were noted in the biocenosis of the natural tularemia focus as a result of constructing the Volgograd Hydro-Electric Power Station and due to the changes of the hydrological regimen of the Volga river, particularly the appearance of an additional winter inundation. These biocenosis changes consisted in a marked reduction of the Arvicola terrestris L. and of other rodent population, as well as a drop of the number of D. marginatus and Rh. rossicus ticks. Bacteriological examination of 8,863 sexually mature D. marginatus and 55 sexually mature Ph. rossicus obtained from the cattle at the floodplain area (where tularemia-infected ticks of the same species were regularly revealed prior to the building of the Volgograd Hydro-Electric Power Station) gave negative results. This should be regarded as a sign of decline of the natural focus of this infection. Examination of the population of the Volgo-Akhtubinsk floodplain area, by means of the skin tularemia demonstrated that the number of persons immuned as a result of vaccination with the live tularemia vaccine averaged 70.8 per cent. The absence during the last few years of any tularemia cases among the residents of the Volgo-Akhtubinsk floodplain area was due not only to the vaccinations, but also to the decline of the natural focus of this infection. Epidemiological and epizootological observation over the Volgo-Akhtubinsk floodplain area should be continued with the data pointing to eradication of the natural focus of tularemia the vaccination should be reduced. (Author)

AD-618 869 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
BACTERIOPHAGE-RESISTANT MUTANTS OF PASTEURELLA PESTIS AND THEIR PROPERTIES,
by A. I. Volosivetz. 1965, 9p
Translation-1070
TT 65-62803

Unclassified report

Trans. of Byulleten Eksperimentalnoi Biologii i Meditsiny (USSR) v56 n11 p107-10 1963.

Descriptors: (*Bacteriophages, Pasteurella pestis), (*Pasteurella pestis, Mutations), Viability, Chemical properties, Growth, Culture media, Pathology, Rabbits, USSR.

An inquiry was made into spontaneous mutation from the bacteriophage-sensitivity to bacteriophage-resistance in Past. pestis of different virulence. According to preliminary data, mutants resistant to bacteriophage appeared irrespective of the degree of the initial strain virulence and of the bacteriophage species used. Variants were isolated from the mutants which by their chemical properties and capacity to grow on differential-diagnostic media and high pathogenicity for rabbits could be referred to pseudotuberculosis causative agents. (Author)

AD-618 870 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
EVALUATION OF AN IMPROVED TULAREMIA DIAGNOSTIC ANTIGEN,
by O. S. Emelyanova, O. V. Ravdonikas, L. S. Egorova, N. V. Panina, and V. G. Pilipenko. 1962, 14p
Translation-1039
TT 65-62804

Unclassified report

Trans. of *Zhurnal Mikrobiologii, Epidemiologii Immunobiologii (USSR) v40 n10 p85-92 1963.

Descriptors: (*Pasteurella tularensis, Antigens + antibodies), (*Antigens + antibodies, Pasteurella tularensis), Immune serums, Vaccines, Diseases, Brucella, Sensitivity, Diagnosis, USSR.

Agglutinability of tularemia diagnosticum prepared from the American variant of B. tularensis was tested by scientific-practical institutions under control of the usual diagnosticum. In examining 946 sera of persons vaccinated against tularemia it was established that the greatest agglutinability was possessed by the diagnosticum from the highly virulent Schu strain (93 per cent of positive results), slightly lesser -- by that from the attenuated culture of the same strain (89per cent of positive results) and the least was possessed by the usual diagnosticums (75 per cent of positive results). The same sensitivity gradation for diagnosticums was confirmed in staging the agglutination reaction with 110 sera of patients and persons who formerly sustained tularemia, the number of sera reacting with the diagnosticums equalling 108, 107 and 105 respectively. In staging the reaction with the sera of brucellosis patients or persons who had this disease, as well as with the sera of patients with other affections (a total of 245 sera) the number of positive results equalled 28, 24 and 12 respectively. The possibility is not excluded that in individual cases these reactions are conditioned by the fact that donors sustained tularemia in the past or were vaccinated against this infection. Sera of 30 healthy persons, who never sustained tularemia and were never vaccinated against this disease failed to react with the diagnosticums. Diagnosticum prepared from the virulent American variety is recommended for detection of agglutinins in the sera with a low antibody level. (Author)

AD-618 889 Div. 16/1, 16/10, 28/3
CFSTI Prices: HC$5.00 MF$1.25

Naval School of Aviation Medicine, Pensacola, Fla.
CATALOG OF SCIENTIFIC PUBLICATIONS, 1942-1963,
comp. by Peggy E. Stearns and Catherine F. Kasparek. 31 Dec 63, 184p
Unclassified report

Descriptors: (*Aviation medicine, Indexes), Periodicals, Catalogs, Bibliographies, Reports, Biochemistry, Physiology, Radiobiology, Space medicine, Space biology, Psychophysiology, Psychology, Pathology, Naval personnel, Medical research.

AD-618 899 Div. 16/3, 16/10
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
STUDYING ALBUMIN FRACTIONS OF THE BLOOD BY THE ELECTROPHORESIS METHOD OF CHRONIC MOUTH DISEASES,
by P. N. Andrianov. 22 Jul 65, 10p
Rept. no. FTD-TT-65-530
TT 65-62811
Unclassified report

Unedited rough draft trans. of Stomatologiya (USSR) v42 n3 p29-33 1963.

Descriptors: (*Serum albumin, Immunity), (*Infectious diseases, Mouth), (*Electrophoresis, Serum albumin), Globulins, Histamine, Diseases, Therapy, USSR.

Conclusions: The examined patients showed an increase in globulin content and reduction in albumina. This displacement becomes more pronounced in dependence upon the duration of the illness and upon the rise in histamine level in blood serum. In all patients at the mentioned illnesses considerably increased the and in part of the patients alpha-and beta globulines. Repeated examination of patients after therapy showed that the state of albumina fractions improved, histamine level decreased, general condition improved. This allows to continue with the perfection of basic therapy of the named illnesses. (Author)

AD-618 967 Div. 16/4

Oregon State Univ., Corvallis.
REVISED SYNONYMY IN THE GENUS EUCERCERIS WITH A DESCRIPTION OF THE TRUE FEMALE OF E. ELEGANS CRESSON (HYMENOPTERA: SPHECIDAE),
by Herman A. Scullen. 1960, 6p
Unclassified report

Pub. in Entomological News v76 n5 p131-6 May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Hymenoptera, Morphology(Biology)), Males, Females, Identification, Ecology.

AD-618 968 Div. 16/4

Texas Univ., Austin.
SEED OF NATIVE TEXAS GOURD, CUCURBITA TEXANA, NOW AVAILABLE TO GENETICISTS,
by Donovan S. Correll. 1962, 2p
Grant NSF G15901
Unclassified report

Pub. in Wrightia v2 n6 p243-4 Apr 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Plants(Botany), Texas), Seeds, Fruits, Genetics.

AD-618 970 Div. 16/4

Colorado Univ., Boulder.
GASTROPODA ON THE 1962 UNIVERSITY OF COLORADO MUSEUM EXPEDITION IN MEXICO,
by Branley A. Branson and Clarence J. McCoy, Jr. 1963, 16p
Grant NSF G16244
Unclassified report

Pub. in University of Colorado Studies, Series in Biology n13 p1-16 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Gastropoda, Morphology(Biology)), Ecology, Mexico.

AD-618 977 Div. 16/4

California Univ., Los Angeles.
MOSQUITO STUDIES (DIPTERA, CULICIDAE). I. A PROJECT FOR A SYSTEMATIC STUDY OF THE MOSQUITOES OF MIDDLE AMERICA. II. METHODS FOR THE COLLECTION, REARING AND PRESERVATION OF MOSQUITOES,
by John N. Belkin, Charles L. Hogue, Pedro Galindo, Thomas H. G. Aitken, and Robert X. Schick. 1965, 80p
Contract DA49 193MD2478; Grant PHS AI04379
Unclassified report

Contributions of the American Entomological Institute v1 n2 p2-78 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Culicidae, Central America), Research program administration, Biological laboratories, Scientific personnel, Collecting methods, Larvae, Adults, Life cycle, Diseases, Ecology, Storage, Preservation, Reports, North America, South America, West Indies.

The primary objectives of the project are (1) to describe and illustrate in detail all the known stages of mosquitoes found in the area; (2) to summarize all the readily available information on distribution, bionomics, and disease relations of all species; (3) to analyze the mosquito fauna of the area from the standpoint of its composition, origin, and evolution and its relationships with the mosquito fauna of the rest of the world; and (4) to make all the data obtained available in preliminary and definitive publications.

AD-618 978 Div. 16/4

Purdue Univ., Lafayette, Ind. Agricultural Experiment Station.
THE SPECIES OF PUCCINIA ON THE PANICEAE,
by P. Ramachar and George B. Cummins. 1965, 55p Paper no. 2402
Grant NSF G16418
Unclassified report

Pub. in Separatum v25 n1/2 p7-60 1965 (Copies available only to DDC users).

Descriptors: (*Grasses, Fungi), (*Fungi, Morphology-(Biology)), Plants(Botany), Tropical regions, Ecology, Parasites, Spores, Distribution.

AD-618 983 Div. 16/4

Miami Univ., Coral Gables, Fla.
A SYNOPSIS OF THE AMPHISTERNINI (COLEOPTERA: ENDOMYCHIDAE),
by H. F. Strohecker. 1963, 40p
Grant NSF G9023
Unclassified report

Pub. in Pacific Insects v6 n2 p319-57 1964 (Copies available only to DDC users).

Descriptors: (*Coleoptera, Morphology(Biology)), Ecology, Distribution.

The intent of this paper, and of others projected on the Endomychidae, is to establish usage of specific names based on study of holotypes or lectotypes. Most of the species treated here are known from very little material, often a single specimen, and original descriptions are in some cases indecisive.

AD-618 984 Div. 16/1

Toronto Univ. (Ontario). Dept. of Medical Biophysics.
DECLINE IN COLONY-FORMING ABILITY OF MARROW CELLS SUBJECTED TO SERIAL TRANSPLANTATION INTO IRRADIATED MICE,
by L. Siminovitch, J. E. Till and E. A. McCulloch.
17 Mar 64, 9p
Grants DRB9350 14G, DRB9350 14C
Unclassified report

Pub. in Journal of Cellular and Comparative Physiology v64 n1 p23-31 Aug 1964
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Bone marrow, Cells(Biology)), (*Hemopoietic system, Regeneration), (*Transplantation, Bone marrow), Spleen, Radiation effects, Mice, Canada.

It is concluded that colony-forming cells derived from normal marrow are not capable of indefinite proliferation when they are subjected to the pressure of repeated transplantation. Cells with colony-forming ability found within spleen colonies cannot be considered to be exact replications of their original colony-forming ancestors since they have reduced capacity for self-renewal. This view is supported by the results of preliminary experiments designed to compare the radiation sensitivities of colony-forming cells before and after transplantation. It was found that the radiation sensitivity of colony-forming ability increases in cells subjected to serial transplantation, which again suggests that the self-renewal process does not necessarily result in an exact replication of the original colony-forming cells.

AD-618 985 Div. 16/11

Stanford Research Inst., Menlo Park, Calif.
THE ACTION OF STIMULANT AND DEPRESSANT AGENTS ON LOCAL CEREBRAL IMPEDANCE AND CIRCULATION,
by Lucy Birzis and Shunro Tachibana. 13 Dec 63, 12p
Contract Nonr299300; Grant NIH NB03325
Unclassified report

Pub. in Psychopharmacologia v6 p256-66 1964 (Copies available only to DDC users).

Descriptors: (*Pharmacology, Brain), (*Brain, Blood circulation), (*Blood circulation, Electroencephalography), (*Cerebral cortex, Drugs), Hypnotics + sedatives, Amphetamines, Purine alkaloids, Barbiturates, Chlorpromazine, Ethers, CNS stimulants, Vasoactive agents, Epinephrine, Sleep, Electrocardiography, Cats.

The effect of typical stimulant and depressant drugs on local cerebral impedance patterns has been studied in unanesthetized, intact cats with indwelling electrodes. Blood flow variations have been deduced from changes in amplitude of the pulsatile electrical impedance recorded across the electrodes. Amphetamine produced bradycardia and a selective increase in cortical impedance and blood flow. At subcortical sites there was a tendency toward decreased flow with minimally effective doses and increased flow with maximally effective doses. Caffeine also showed a similar, but less marked selective increase in cortical flow but with an accompanying tachycardia. Sedation with pentobarbital was typically accompanied by generalized reduction in cerebral blood flow and tachycardia, except that the hypothalamus retained considerable vasomotor activity in the early post-drug period. Chlorpromazine, on the other hand, had little effect on general cerebral circulation but selectively depressed hypothalamic blood flow and vasomotor responsiveness. Ether anesthesia was associated with large increases in subcortical blood flow and little or no increase in cortical flow. Stimulant and depressant drugs were compared with intravenously injected epinephrine and with natural states of alertness in their effects on local cerebral blood flow. Circulatory patterns after amphetamine did not resemble those of arousal or of epinephrine, and those of pentobarbital differed from the patterns of natural sleep. (Author)

AD-618 991 Div. 16/4

Miami Univ., Coral Gables, Fla.
FAMILY ENDOMYCHIDAE. 22,
by H. F. Strohecker and Michio Chujo. 1964, 3p
Grant NSF G9023
Unclassified report

Pub. in Nature and Life in Southeast Asia v3 p229-30 Mar 1964 (Copies available only to DDC users).

Descriptors: (*Coleoptera, Southeast Asia), Morphology-(Biology), Ecology, Thailand, Laos.

AD-618 993 Div. 16/1

Research Lab. of Electronics, Massachusetts Inst. of Tech., Cambridge.
PROCESSING AND TRANSMITTING INFORMATION THROUGH THE CENTRAL NERVOUS SYSTEM,
by Joseph L. Hall. 1964, 6p
Contract DA 36 039AMC03200E; Grant NSF GP2495
Unclassified report

Pub. in I E E E Student Journal p29-34 May 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Central nervous system, Hearing), Nerve impulses, Auditory nerve, Cats, Humans.

Experiments were performed to explore the relationship between patterns of neural activity in the central nervous system and the binaural localization of sounds. Acoustic clicks were presented to the 2 ears of anesthetized cats that had been operated upon so as to expose the brain. A neural model was attained identifying the relative amounts of cell activity in the left and right accessory nuclei of the brain's superior olive with position of the virtual image, with the result that the image was perceived on the side where fewer cells

respond. On comparison between predictions of the model with results from human psychophysics, the cells fired more when the stimulus to the contralateral ear (on the opposite side) comes first and when the clicks are made more intense. There was good agreement between these results and those of psychophysical experiments on humans.

AD-618 994 Div. 16/4

Virginia Polytechnic Inst., Blacksburg.
THE SYSTEMATIC POSITION OF THE BRANCHIOBDELLIDAE (ANNELIDA: CLITELLATA),
by Perry C. Holt. 31 Mar 65, 9p
Grant GB372

Unclassified report

Pub. in Systematic Zoology v14 n1 p25-32 31 Mar 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Annelida, Morphology(Biology)), Ecology, Physiology, Anatomy.

The annelid worms which are epizoic on horartic freshwater crustaceans were considered by their discoverers to be leeches (Odier, 1823). At a later period they were assigned to the oligochaetes (Vejdovsky, 1884; Michaelsen, 1909; Pierantoni, 1912). The question of their affinities has recently been reopened (Franzen, 1963). The author reviews the structure, distribution, and habits of these animals, currently included in the oligochaete family Branchiobdellidae and advances additional reasons for his belief that this family should be elevated to ordinal rank.

AD-619 000 Div. 16/4, 32/1
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
THE ROOT KNOT NEMATODE IN TADZHIKISTAN,
by E. V. Matlashenko. Jun 65, 3p
Translation-1411
TT 65-62816

Unclassified report

Trans. of Zashchita Rastenii ot Vreditelei i Boleznei (USSR) v9 n7 p53 1964.

Descriptors: (*Plants(Botany), Nematodes), (*Nematodes, Plants(Botany)), Vegetables, Agriculture, USSR.

AD-619 001 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
EXPERIMENTAL STUDY OF THE IMMUNOGENIC PROPERTIES OF ASSOCIATED ANAEROBIC TOXIDS. COMMUNICATION V. IMMUNOGENIC PROPERTIES OF COMBINED POLYTOXOID IN PRIMARY IMMUNIZATION OF ANIMALS,
by G. V. Vygodchikov, A. A. Vorobev, L. A. Larina, A. P. Labinskii, and V. D. Gekker. 1962, 13p
Translation-103015
TT 65-62817

unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v40 n10 p51-8 1963.

Descriptors: (*Vaccines, Toxins + antitoxins), Immunity, Antigens + antibodies, Salmonella, Clostridium botulinum, Immune serums, USSR.

The paper deals with experimental data on the immunogenicity of a complex associated preparation, consisting of 8 anaerobic toxins and complete antigens of typhoid and paratyphoid B bacilli. The efficacy of the associated preparation in respect to all the antigens contained was shown in primary immunization of animals. (Author)

AD-619 002 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
IMPROVEMENT OF THE NUTRIENT MEDIUM AND THE SEARCH FOR A METHOD OF PURIFYING THE PROTECTIVE ANTHRAX ANTIGEN,
by N. I. Aleksandrov, N. E. Gefen, V. F. Runova, A. P. Budak, and Yu. V. Ezepchuk. 1962, 10p
Translation-1028
TT 65-62818 Unclassified report
Trans. of Zhurnal Mikrobiologii, Epidemiologii i immunobiologii (USSR) v40 p103-7 Jan 1963.

Descriptors: (*Bacillus anthracis, Antigens + antibodies), (*Culture media, Bacillus anthracis), Purification, Vaccines, Immunity, Toxicity, Adsorption, USSR.

As a result of work on cultivation of anthrax microbe to obtain a protective antigen a milk-peptone medium was suggested. To isolate the anthrax antigen from the culture fluid a method of its precipitation with ethyl alcohol is recommended, with subsequent concentration and stabilization of the antigen, its sorption on aluminum hydroxide and lyophilization. Chemical sorbed vaccine, obtained by the mentioned method, provoked but insignificant postvaccinal reactions, and possessed sufficiently high immunogenic properties. (Author)

AD-619 003 Div. 16/2, 16/4
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
EXPERIMENTAL STUDY OF THE MECHANISM OF TRANSMISSION OF PLAGUE INFECTION AMONG MIDDAY AND TAMARISK GERBILS (MERIONES MERIDIANUS PALL. AND M. TAMARISCINUS PALL). FROM THE VOLGA-URAL INTERFLUVIAL AREA. REPORT NO. 4. SUPPLEMENT TO THE PROBLEM OF THE INFECTION ABILITY OF FLEAS ON MIDDAY GERBILS,
by A. I. Shtelman. 1963, 5p Translation-1421
TT 65-62819

Unclassified report

Trans. of Meditsinskaya Parazitologiya i Parazitarnye Bolezni (USSR) v32 n6 p739-40 1963.

Descriptors: (*Pasteurella, Disease vectors), (*Disease vectors, Pasteurella), Rodents, Siphonaptera, Ecology, USSR.

AD-619 004 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
ISSUES OF TULAREMIA VACCINOPROPHYLAXIS IN THE WORKS OF AMERICAN AUTHORS (A REVIEW OF THE LITERATURE),
by V. A. Lebedinskii. 1962, 8p Translation-1042
TT 65-62820

Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v40 n10 p140-2 1963.

Descriptors: (*Pasteurella, Vaccines), United States, Reviews, Immunity, Pasteurella tularensis, Bacterial aerosols, Antigens + antibodies, Effectiveness, Dosage, USSR.

AD-619 005 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
OBSERVATIONS ON THE FIBRINOLYTIC ACTIVITY OF PLAGUE AND PSEUDOTUBERCULOSIS BACILLI,
by G. A. Yaromyuk. Jun 65, 10p Translation-1412
TT 65-62821
Unclassified report

Trans. of Irkutskii Gosudarstvennyi Nauchno-Issledovatel'skii Protivochumnyi Institut Sibiri i Dal'nego Vostoka. Izvestiya (USSR) v24 p196-201 1962.

Descriptors: (*Pasteurella, Plasmin), (*Plasmin, Pasteurella), Fibrin, Fibrinogen, Blood coagulation, Enzyme precursors, Streptococcus, USSR.

Conclusions: Fibrinolytic activity is one of the rather constant properties of the plague microbe. The fibrinolytic activity of virulent and avirulent strains of the plague microbe are the same. A correlation between fibrinolytic activity and virulence in the plague microbe is absent. The pseudotuberculosis microbe does not possess fibrinolytic properties. The fibrinolytic test may be used as one of the methods for the differentiation of the plague and pseudotuberculosis microbes. (Author)

AD-619 006 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
CONTAMINATION OF TISSUE CULTURES WITH PLEUROPNEUMONIALIKE ORGANISMS (PPLO),
by V. S. Levashev and Ya Ya. Tsilinskii. Jun 65, 8p Translation-1413
TT 65-62822
Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v41 n4 p115-8 1964.

Descriptors: (*Tissue culture, Biological contamination), Tissue culture cells, Embryonated egg technique, Microorganisms, Culture media, Kidneys, Morphology-(Biology), Antibiotics, Stabilization, Purification, USSR.

Conclusions: Subinoculated cultures of Detroit-6, HLS, KB, Hep-2, Sots, ERK, HeLa, APO and amniotic FL cells, obtained from various laboratories, were contaminated with pleuropneumonialike organisms. This must be taken into consideration when working with these cultures. The contamination of initial cultures of trypsin treated monkey and rabbit kidneys and human and chick embryo fibroblasts with pleuropneumonia-like organisms was insignificant (3-4%), which, however, must be kept in mind, since some of these cultures are used in the production of biologicals. For the determination of the contamination of cultures it is convenient to make use of the seeding of the cultural liquid on 0.3% agar with normal horse serum, on which the pleuropneumonialike organisms form colonies of a typical morphology, and are exposed in the phase contrast microscope without the application of special staining methods. The use of the antibiotic mycerin makes it possible to purify stable tissue cultures from pleuropneumonialike organisms. (Author)

AD-619 007 Div. 16/4, 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
APPLICATION OF THE BACTERIOLOGICAL METHOD FOR COMBATING RODENTS,
by E. F. Kish. Jun 65, 4p Translation-1417
TT 65-62823 Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v41 n9 p147-8 1964.

Descriptors: (*Rodenticides, Bacteria), Public health, Culture media, Rats, Mice, USSR.

AD-619 008 Div. 16/11, 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
TETRACYCLINE FOR THE TREATMENT OF AVIAN PASTEURELLOSIS,
by V. I. Zyuban. Jun 65, 8p Translation-1416
TT 65-62824
Unclassified report

Trans. of Veterinariya (USSR) v40 n12 p55-7 1963.

Descriptors: (*Tetracyclines, Pasteurella), (*Pasteurella, Tetracyclines), (*Birds, Pasteurella), Antibiotics, Dosage, Chickens, USSR.

AD-619 009 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
APPLICATION OF THE STATISTICAL METHOD IN THE STUDY OF EPIDEMIOLOGICAL RELATIONS,
by M. N. Tkacheva. Jun 65, 11p
Translation-1415
TT 65-62825
Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v41 n9 p60-4 1964.

Descriptors: (*Epidemiology, Statistical analysis), Urban areas, Population, Muscidae, Infectious diseases, Immunity, USSR.

AD-619 010 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
THE STABILITY OF BIOLOGICAL PROPERTIES IN THE ANTHRAX STI-1 VACCINE STRAIN,
by N. N. Ginsburg, R. A. Saltkov, and V. R. Arkhipova. Jun 65, 8p
Translation-1419
TT 65-62826
Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v41 n9 p104-7 1964.

Descriptors: (*Bacillus anthracis, Vaccines), Culture media, Growth, Spores, Morphology(Biology), Stabilization, USSR.

In cultures of the STI-1 strain, which over a period of 20 years following isolation were subjected to periodic reinoculation and storage in 30% glycerin, signs of dissociation were observed. These were expressed in the appearance of the nature of growth on solid and liquid nutrient media which was not typical for the anthrax microbe. A 3rd generation sport culture of the STI-1 strain, which had been stored in a desiccated (lyophilized) form for 18 years, preserved all the biological features characteristic for the strain, both in regards to type of growth on nutrient media as well as in regards to reactogenicity and immunogenicity for animals. Storage of spore cultures of a strain -- standards in a desiccated state, must be recognized as the optimum conditions for the stabilization of the properties of the strain. On

the basis of the data from the study of the new standard STI-1 vaccine strain (1962) it must be recommended that this standard culture be used for the production of live anthrax vaccine, and also for scientific-research work, using it to replace all the other cultures (lines) of this strain being used in various laboratories. (Author)

AD-619 034 Div. 16/1, 28/3, 30/2, 16/15
CFSTI Prices: HC$4.00 MF$1.00

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN INVESTIGATION OF MEMORY PATTERN FORMATION IN A MODEL OF THE HUMAN VISUAL CORTEX.
Master's thesis,
by William Millard Reed. Jun 65, 142p
Rept. no. GGC/EE/65-12
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Vision, Mathematical models), (*Bionics, Vision), (*Pattern recognition, Cerebral cortex), (*Memory, Vision), Eye, Retina, Optical images, Color vision, Learning, Diffraction, Integrals, Programming-(Computers), Physiology, Psychophysiology.

Several investigations have been conducted on the pattern recognition capability of a proposed model of the visual cortex. This investigation is aimed at determining the internal relationships existing within the model. Special emphasis is placed on the formation of memory patterns during the 'learning' process. A model is developed which enables the investigation of single inputs unhampered, in most cases, by the limitation of array size. The effects of coupling on the spatial distribution of the memory patterns are investigated. In addition, the transient and stability effects are investigated from the standpoint of computer operation time. An attempt is made to correlate the memory patterns with one case of Fraunhofer diffraction. As a result of the background research into the human visual system, a proposal is made for considering the eye as a diffracting, rather than an imaging, device. An experiment is also suggested which may isolate possible sub-channels within the visual channel, which may be concerned with the transmission of color information. (Author)

AD-619 076 Div. 16/11, 15/2
CFSTI Prices: HC$6.00 MF$1.50

Harvard Univ., Cambridge, Mass.
COMPARISON OF SEQUENTIAL EXPERIMENTS FOR ESTIMATING THE MEDIAN LETHAL DOSE.
Doctoral thesis,
by Miles Davis. Jun 65, 251p
Contract Nonr186637, Proj. NR042 097
Unclassified report

Descriptors: (*Dosage, Sequential analysis), (*Sequential analysis, Biological assay), Toxicity, Drugs, Factor analysis, Statistical distributions.

Some designs for biological assays with quantal responses are reviewed. Five sequential experimental designs are compared with two non-sequential designs. The method of computation and the conditions under which the conceptual experiments are conducted are given. The distribution of the median lethal dose estimate is summarized by its variance, squared bias, mean square error about m and measures of skewness and kurtosis. The mean square errors are graphed, tabled, and discussed for sequential and non-sequential experiments.

AD-619 105 Div. 16/2

Army Medical Research Lab., Fort Knox, Ky.
LYMPHOCYTIC CHORIOMENINGITIS.
Reprint rept.,
by Fred D. Maurer. 1964, 11p
Rept. no. USAMRL-618
Proj. 3A013001A814, Task 01
Unclassified report

Pub. in Laboratory Animal Care v14 n5 p415-9 Oct 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Laboratory animals, Virus diseases), (*Virus diseases, Laboratory animals), Biological laboratories, Hazards, Disease vectors, Brain, Spinal cord, Encephalitis, Arboviruses, Lymphocytes.

Lymphocytic choriomeningitis (LCM) is an enzootic, viral disease of lower animals, which when present, is a hazard to people who work with laboratory animals for the following reasons. Being prevalent in wild rodents, it readily spreads to most species of laboratory animals unless specific precautions are taken to keep it out. Although generally occurring in a subclinical form it is so readily transmitted directly, indirectly, or via insect vectors that it may become widely spread throughout an animal colony before its presence is known. From experimental animals it has frequently contaminated other viruses being studied, invalidating results. Contact with infected animals and contaminated materials has resulted in numerous human cases varying in severity from inapparent to rarely fatal. As the name implies, in its acute form it produces an encephalomyelitis with lymphocytic infiltration of the choroid plexus, meninges and ependyma. The immunologic character of the disease in mice varies with the manner of infection. Periodic checking of an animal colony for the presence of LCM is recommended. (Author)

AD-619 107 Div. 16/13, 16/11, 16/2

California Univ., Los Angeles. School of Medicine.
RENAL LYMPH AND ANTIBACTERIAL LEVELS IN THE TREATMENT OF PYELONEPHRITIS,
by Yale J. Katz, A. T. K. Cockett, and R. S. Moore.
4 Sep 64, 15p
Grant AF AFOSR246-63, Proj. 7164, Task 716401
AFOSR 65-0964 Unclassified report
Pub. in Life Sciences v3 n11 p1249-62 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Kidneys, Cannulation), (*Chemotherapeutic agents, Urinary system), Bacteria, Lymphatic system, Diseases, Escherichia coli, Lymph, Urine, Blood, Antibiotics.

A method for the cannulation of renal lymphatics is described. A 2-3 fold increase in lymph concentrations of nitrofurantoin over plasma was observed 1-1/2 to 2 hr after infusion by gastric tube. Maximal microbiological activity against E. coli was noted in the renal lymph at 1-1/2 to 2 hr. The hilar lymphatics were also cannulated. It appeared that these vessels draining the medulla contained a still higher concentration of the antibacterial. The kidney interstitium diverted bacteriologically active nitrofurantoin into the renal lymphatics. An antimicrobial assay of renal lymph along with urine and blood levels is indicated to determine the effectiveness of any therapeutic agent. (Author)

AD-619 109 Div. 16/3, 16/9

Cincinnati Univ., Ohio. Dept. of Microbiology.

COMBINABILITY OF AVIDIN AND STREPTAVIDIN WITH ANALOGS OF BIOTIN,
by Herman C. Lichstein and Jerome Birnbaum.
17 May 65, 5p
Contract Nonr360900; Grant NSF GB2595, Proj. NR103 555
Unclassified report

Pub. in Biochemical and Biophysical Research Communications v20 n1 p41-5 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Vitamin B complex, Chemical reactions), (*Proteins, Chemical reactions), Bacteria, Metabolism, Culture media, Growth, Complex compounds.

To determine the relative binding of biotin analogs, known amounts of avidin and streptavidin were mixed with excessive amounts of the analogs in distilled water. The mixtures were incubated at room temperature for 1 hour and the remaining unbound analog assayed microbiologically with Saccharomyces cerevisiae. Avidin complexed with biocytin, desthiobiotin, and oxybiotin nearly as well as with biotin. This suggests that the carboxyl group and the sulfur atom are not important in the binding of biotin to avidin. The combinability of streptavidin with biocytin further suggests that the carboxyl group is not necessary for binding to either protein. The inability of biotin diamine sulfate to bind to avidin or streptavidin confirms directly the need for an intact urea ring to promote avidin and streptavidin combinability. Qualitative data were obtained suggesting that the addition of an oxygen atom to the sulfur as in d-biotin-d-sulfoxide also prevents the binding to streptavidin but has no effect on combinability with avidin. The employment of both avidin and streptavidin could be an important tool in helping to elucidate the structure of unknown analogs of biotin that are biologically active. (Extracted)

AD-619 111 Div. 16/10

Armed Forces Inst. of Pathology, Army Medical Center, Washington, D. C.
PATHOLOGY OF THE NEVOID BASAL CELL CARCINOMA SYNDROME,
by J. K. Mason, Elson B. Helwig, and James H. Graham. 23 Jul 64, 8p Unclassified report

Pub. in Archives of Pathology v79 p401-8 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Cancer, Diagnosis), (*Histology, Cancer), Pathology, Medical examination, Neoplasms, Skin.

The substitution of 'nevoid basal cell carcinoma syndrome' for the commonly accepted title 'basal cell nevus syndrome' is suggested as a means of removing a source of confusion. The criteria for selecting cases of the syndrome are discussed. Seven patients in the AFIP records were regarded as true instances, while six were accepted as probable examples of the syndrome. The patterns of the basal cell tumors present have been assessed, and it is concluded that the pathologist cannot distinguish a nevoid from a frank basal cell carcinoma on the basis of the histologic appearance alone. This was confirmed in a reexamination of basal cell tumors removed from a group of young persons. Nevoid basal cell carcinoma can, however, be distinguished from epithelioma adenoides cysticum with relative ease. The importance to the patient of a correct diagnosis is discussed, and minor recommendations as to how the pathologist may assist in this are given. (Author)

AD-619 112 Div. 16/10

Armed Forces Inst. of Pathology, Army Medical Center, Washington, D. C.
UNILATERAL RETINAL DYSPLASIA,
by William S. Hunter and Lorenz E. Zimmerman.
13 Jan 65, 8p
Grant PHS NB5379 03
Unclassified report

Pub. in Archives of Ophthalmology v74 p23-30 Jul 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Retina, Anomalies), (*Eye, Pathology), Ophthalmology, Chromosomes, Genetics, Histology.

Use of the histopathologically descriptive term 'retinal dysplasia' to indicate a syndrome of bilateral ocular maldevelopment with systemic anomalies is misleading and should be discontinued. Dysplastic retina may be found in many, but not all, eye abnormalities, with or without systemic anomalies, and occurring unilaterally or bilaterally. Some cases are now known to be associated with a chromosomal anomaly, others with a less gross genetic familial defect, but many are sporadic. In all cases the histologic appearance of the dysplastic retina suggests disturbed differentiation of neural ectoderm. The eponymic term 'Reese-Blodi-Straatsma syndroms' is suggested as a convenient appropriate substitute for 'retinal dysplasia' in designating the syndrome of bilateral ocular malformation associated with other lethal visceral malformations. (Author)

AD-619 114 Div. 16/10

Armed Forces Inst. of Pathology, Army Medical Center, Washington, D. C.
EFFECTS OF FREEZING AND THAWING ON ENZYMES OF MOUSE LIVER: ACID PHOSPHATASE, GLUCOSE-6-PHOSPHATASE, URICASE, AND ADENOSINE DEAMINASE,
by Charles C. Griffin, Vaman S. Waravdekar, Peter J. Goldblatt, Benjamin F. Trump, and Robert E. Stowell. 12 Dec 64, 6p
Unclassified report

Research supported in part by American Cancer Society.
Pub. in Archives of Pathology v79 p595-9 Jun 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Freezing, Enzymes), (*Enzymes, Freezing), Liver, Cells(Biology), Cell structure, Phosphoric monoester hydrolases, Saccharide phosphates, Mitochondria, Membranes(Biology), Tissue(Biology), Permeability, Lipoproteins.

Conclusions: The effects produced by three types of rapid freezing and thawing on the activities of several mouse liver enzymes were determined. The enzymes studied were associated with the endoplasmic reticulum (glucose-6-phosphatase), the cytosomes (acid phosphatase), the microbodies (uricase), and the cytoplasmic ground substance (adenosine deaminase). The total activity of acid phosphatase was unaffected by any of the three freezing and thawing procedures. The free activity was 92% of the total after solidified CO2 (Dry Ice) and 100% after isopentane and propane. Increases of 6%, 9%, and 10% were noted in the unsedimentable activity of this enzyme after freezing by solidified CO2, isopentane, and propane, respectively. Uricase and adenosine deaminase activities were essentially unaffected by any of the freezing and thawing treatments employed or by treatment of homogenates with sonic vibrations. Glucose-6-phosphatase displayed increased activities of 34%, 45%, and 45% after freezing on solidified CO2, in isopentane, or in propane, respectively. These changes in enzymatic activity are correlated with previously described alterations in the ultrastructure of hepatic cells and discussed in relation to current concepts of the nature of cellular injury after freezing and thawing. (Author)

AD-619 117 Div. 16/10

Armed Forces Inst. of Pathology, Army. Medical Center, Washington, D. C.
SYMPTOMATIC ANGIOMYOLIPOMA OF THE KIDNEY,
by Edward B. Price, Jr. and F. K. Mostofi.
4 Sep 64, 14p

Unclassified report

Pub. in Cancer v18 n6 p761-74 Jun 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Kidneys, Pathology), (*Neoplasms, Kidneys), Diagnosis, X rays, Surgery, Hemorrhage, Adipose tissue, Blood vessels, Muscles, Histology, Histological techniques.

From the files of the Kidney Tumor Registry 30 cases of symptomatic angiomyolipoma have been studied. In contrast to the tumors occurring in patients with tuberous sclerosis complex, those in patients without tuberous sclerosis complex are often large and symptomatic, necessitating surgical removal. The clinical picture ranges from that of an acute abdominal emergency to that of renal colic, renal suppuration or renal cell carcinoma. Roentgenographic examination of the urinary tract may be of considerable help in the diagnosis of these tumors. Surgically, these tumors are characterized by large size, by expansile growth and by a tendency to be associated with hemorrhage, which may occur within the substance of the tumor or within the perinephric tissues. This hemorrhagic tendency is thought to be the major factor responsible for the production of clinical symptoms. Pathologically, the tumors are composed of mature adipose tissue; blood vessels having considerable variability as to type, size, arrangement and structure; and smooth muscle occurring in the form of perivascular cuffs or in sheets of interlacing bundles. The organization of these 3 major components may vary within a certain range and tumors may have areas that are predominantly lipomatous or leiomyomatous. Angiomyolipoma, whether occurring in a patient with or one without tuberous sclerosis, constitutes a distinct tumor type. The tumors are believed to be hamartomatous rather than neoplastic and in our experience they have proved benign, despite apparent local extension beyond the confines of the kidney and a tendency to pleomorphism of some of the smooth muscle cells. (Author)

AD-619 120 Div. 16/11

Walter Reed Army Inst. of Research, Washington, D. C.
DIALYSIS FOR INTOXICATION WITH LIPID SOLUBLE DRUGS: ENHANCEMENT OF GLUTETHIMIDE EXTRACTION WITH LIPID DIALYSATE,
by James H. Shinaberger, Leroy Shear, Lloyd E. Clayton, Kevin G. Barry, and Marjorie Knowlton.
1965, 5p

Unclassified report

Pub. in Trans. Amer. Soc. Artif. Int. Organs v11 p173-7 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Hypnotics + sedatives, Semipermeability), Anesthetics, Pharmacology, Lipids, Solubility, Parenteral infusions, Peritoneum, Membranes(Biology), Blood chemistry, Colloids, Diffusion, Toxic tolerances, Dogs.

These in vivo studies demonstrate that the removal of glutethimide during dialysis is significantly increased when lipid is substituted for the usual aqueous dialysis solution. The very low water solubility of many lipid soluble compounds probably limits their removal by routine dialysis methods. Their high lipid solubility not only permits relatively small volumes of lipid dialysate to contain large amounts of these drugs, but also prevents back diffusion after they have crossed a semipermeable membrane from an aqueous into a lipid phase. This maintains a maximum effective diffusion gradient, resulting in an increased rate of net transfer across the membrane. Concentration ratios during peritoneal dialysis with lipid increased more rapidly than during hemodialysis. This suggests that glutethimide diffuses through the lipid-containing cells of the peritoneum more readily than it does through the cellulose dialyzer membrane. Peritoneal dialysis with lipid emulsion regularly produced visible lipemia which was associated with a slight increase in blood glutethimide concentration. This suggests that glutethimide was extracted from tissue depots into the lipemic plasma. The long-term effects of intraperitoneal lipid emulsion infusion have not been adequately studied, and clinical use of peritoneal dialysis with lipid must await further animal tolerance studies. (Author)

AD-619 126 Div. 16/3, 4/3

Stanford Univ., Calif.
THE ROLE OF DIPOLE INTERACTIONS IN DETERMINING POLYPEPTIDE CONFIGURATIONS.
by David A. Brant and P. J. Flory. 16 Nov 64, 5p
Contract AF49 638 1341, Proj. 9760, Task 976003
AFOSR 65-0876

Unclassified report

Pub. in Journal of the American Chemical Society v87 n3 p663-4 Feb 5 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Peptides, Molecular structure), Chemical bonds, Dipole moments, Proteins, Molecular properties.

A characteristic measure of the unperturbed dimensions of the random polypeptide chain is given by <r sq>0/n-plpsq the ratio of the actual mean square end-to-end distance, <rsq>0, to the mean square end-to-end distance for the random flight chain of virtual bonds, n-p/psq. Experiments were conducted to determine <rsq>0 for 3 polypeptides: poly beta benzyl-L-asparate in m-cresol at 100C, poly-L-glutamic acid in aqueous 0.3 M sodium phosphate at pH 7.85 and 37C, and poly-L-lysine hydrobromide in aqueous 1.0 M sodium bromide at pH 4.54 and 37. A characteristic ratio of 9± 1 was found for all 3 polymers. Previously published results for poly-r-benzyl-L-glutamate yield a value in the same range. The experimental result is much larger than the value of 1.93 calculated assuming free rotation about the single bonds adjoining the a-carbons. Thus, the same value of <rsq>0/n-plpsq holds within experimental error for the systems studied, marked differences in solvents and in amino acid side chains notwithstanding. Investigation of the influence of dipolar interactions on peptide configurations is also reported. (Author)

AD-619 129 Div. 16/1

Washington Univ., Seattle.
METABOLISM OF THE ANTERIOR PITUITARY GLAND IN VITRO: EFFECTS OF FASTING IN MALE AND FEMALE RATS,
by Charles J. Goodner. 26 Jun 64, 5p
Contract DA49 193MD2420; Grant PHS AM07803

Unclassified report

Pub. in Endocrinology v76 n6 p1022-6 Jun 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Pituitary gland, Metabolism), Diet, Deficiency diseases, Starvation, Glucose, Synthesis, Proteins, Morphology(Biology), Biochemistry, Males, Females, Rats.

The metabolism of glucose-ul-C14 and glycine-2-C14 by anterior pituitary (AP) in vitro was examined in fasted, refed and underfed rats. Comparison of males and females demonstrated that AP from female rats lost less weight and displayed lesser alteration of glucose metabolism during acute fasting. Synthesis of protein from glycine was little affected by fasting in either sex. Underfeeding for 7 days decreased glucose metabolism equally in male and female AP. Upon refeeding, glucose metabolism was enhanced above the normal fed level in both groups. The data, both morphological and biochemical, suggest that the impact of fasting upon the AP is less marked in females. (Author)

AD-619 131 Div. 16/4

California Univ., Riverside.
HIRSTIELLA PYRIFORMIS SP. N. (ACARI, PTERYGOSOMIDAE), A NEW PARASITE OF LIZARDS FROM BAJA CALIFORNIA,
by Irwin M. Newell and Raymond E. Ryckman.
2 Aug 63, 11p
Grants E2533, DA MD49 193 62G45
Unclassified report

Prepared in cooperation with Loma Linda Univ., Calif.
Pub. in The Journal of Parasitology v50 n1 p163-71 Feb 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Mites, Morphology(Biology)), (*Reptiles, Parasites), Disease vectors, Parasitic diseases, Ecology, California.

Hirstiella pyriformis sp. n. is found on a number of lizards of the genus Sauromalus. It appears to be generally distributed on islands in the Gulf of California, and also on the mainland of Baja California. Ecological conditions under which the mite and its hosts live are described briefly. (Author)

AD-619 132 Div. 16/4

California Univ., Berkeley.
BIOSYSTEMATICS OF THE HESPEROCIMEX COMPLEX (HEMIPTERA: CIMICIDAE) AND AVIAN HOSTS (PICIFORMES: PICIDAE; PASSERIFORMES: HIRUNDINIDAE),
by Raymond E. Ryckman and Norihiro Ueshima.
1963, 16p
Grants DA MD49 193 62G45, PHS AI0149607
Unclassified report

Pub. in Annals of the Entomological Society of America v57 n5 p624-38 Sep 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Hemiptera, Morphology(Biology)), Birds, Parasites, Ecology, Distribution, United States, Reproduction(Physiology), Chromosomes, Cytology, Anatomy, Males, Females.

The 3 known species of Hesperocimex List, 1925, are keyed, redescribed, and illustrated, their chromosomal complements are compared, and results of hybridization are reported. H. coloradensis List, 1925, an ectoparasite of woodpeckers and purple martins nesting in cavities in trees, ranges from eastern Colorado to California, Oregon, and British Columbia. The sibling species H. sonorensis Ryckman, 1958, and H. cochimiensis Ryckman and Ueshima, 1963, are associated with purple martins nesting in holes made by woodpeckers in large cacti - H. sonorensis in the Saguaro cacti of Arizona and Sonora, H. cochimiensis in the Cardon cacti of Baja California. H. coloradensis is recognizable by its larger size and paler hue; H. sonorensis differs from both the others in having the male intromittent organ strongly curved at its tip, rather than straight. In certain pairings between H. sonorensis and H. cochimiensis, P sub 1 fecundity was greatly reduced, but the F sub 1 and F sub 2 individuals that reached adulthood were fertile. All other pairings attempted between the various species were either unproductive or yielded, at most, sterile F sub 1 offspring. H. sonorensis has a diploid chromosome count of 42 (20 pairs of autosomes plus XX in females, XY in males), and H. cochimiensis, with only 19 pairs of autosomes, has a diploid count of 40. (Author)

AD-619 135 Div. 16/3

RIAS, Inc., Baltimore, Md.
FATTY ACID SYNTHESIS BY EXTRACTS OF EUGLENA,
by G. M. Cheniae and Pat Carey Kerr. 21 Sep 64, 7p
Contract AF49 638 947; Grant NIH PH43 63 36
AFOSR 65-1518
Unclassified report

Pub. in Plant Physiology v40 n3 p452-7 May 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Algae, Fatty acids), (*Fatty acids, Biosynthesis), (*Stearates, Biosynthesis), Enzymes, Antimetabolites, Oxidation, Fatty acid esters, Coenzymers, Thiols, Adenosine phosphates, Labeled substances, Tissue extracts.

It is shown that stearic acid, a major produce of fatty acid synthesis by extracts of Euglena, is synthesized de novo. Moreover, avidin, an inhibitor of biotin-functional enzymes, does not inhibit the system from Euglena and does not alter the distribution of products. Oxidation of the products with peracids does not alter their subsequent chromatographic behavior thus indicating lack of unsaturation in the products. These products occur both in the free and esterified form in approximately equal amounts and with no significant differences in the spectrum of products. Evidence suggests that the esterified acids are derivatives of CoASH and not of glycerides or phospholipids. Essentiality of -SH groups is shown by inhibition by PCMPS and iodoacetamide but not by Cd(++) or arsenite. This inhibition can be prevented by reduced glutathione or cysteine. Mercaptans do not enhance incorporation of acetyl-SCoA but instead, at relatively low concentrations, result in significant inhibition. The requirement for adenosine triphosphate cannot be replaced by adenosine mono- or diphosphate, but can be partially replaced by other nucleoside triphosphates. Addition of octanoyl- or decanoyl-CoA to a system synthesizing fatty acids from acetyl-SCoA does result in isotope dilution but only at high concentrations. (Author)

AD-619 150 Div. 16/7, 16/14, 23/4

National Academy of Sciences-National Research Council, Washington, D. C.
LABORATORY ANIMALS. V. WORKSHOP IN ANIMAL TECHNICIAN TRAINING.
2 Oct 64, 65p Pub-1285
Contracts Nonr230024, PHS PH43 64 44
Unclassified report

Available from National Research Council, Washington, D. C. HC$1.50.

Descriptors: (*Laboratory animals, Symposia), (*Medical technicians, Training), Training devices,

Education, Medical laboratories, Medical research, Biological laboratories, Veterinary medicine.

The purpose of the workshop, sponsored by the Institute of Laboratory Animal Resources, was to evaluate the progress made in training caretakers, and to formulate a plan for the future. Three study groups met and discussed the following assignments: Evaluation and amendment of existing curricula for junior and senior technicians; Determination of types of training needed by supervisory technicians, length of courses, and subject matter; Determination and recommendation of training aids available for both Junior-Senior and Supervisory Technician training courses. Papers were presented by recognized leaders in the field of animal technician training in the United States and Great Britain. From the workshop there evolved a new concept of the animal technician, as well as a working blueprint for development and training of animal technicians.

AD-619 176 Div. 16/7, 16/14, 23/4

National Academy of Sciences - National Research Council, Washington, D. C.
LABORATORY ANIMALS. IV. GRADUATE EDUCATION IN LABORATORY ANIMAL MEDICINE, PROCEEDINGS OF A WORKSHOP, MARCH 26-27, 1964, WASHINGTON, D. C.
1965, 45p Publication no. 1284
Grant PHS CA05268 04
Unclassified report

Rept. of the Institute of Laboratory Animal Resources.
Available from Printing and Publication Office, NAS-NRC, 2101 Constitution Ave, N. W., Washington, D. C. 20418, $1.25.

Descriptors: (*Laboratory animals, Symposia), (*Veterinary medicine, Laboratory animals), (*Medical personnel, Education), Medical research, Training.

The Institute of Laboratory Animal Resources maintains a professional staff and consultants who are available for projects such as the organization of special workshops on laboratory animal technology. Aware of an urgent need for communication and exchange of information on problems of posdoctoral education in laboratory animal medicine, the Committee on Professional Education set up a four-part program as follows: (1) Site surveys were made of eighteen veterinary schools or colleges to determine what role these institutions play in educating both pre- and postdoctoral students in the discipline of laboratory animal medicine. (2) An examination was made of college programs now providing training of laboratory animal colony directors and research workers in laboratory animal medicine. (3) A realistic figure was established representing the projected need for individuals with specialized training in laboratory animal medicine. (4) Following these site visits and questionnaire surveys, a Workshop on Graduate Education in Laboratory Animal Medicine was held.

AD-619 224 Div. 16/3

RIAS, Inc., Baltimore, Md.
PLASTOCYANIN PHOTO-OXIDATION BY DETERGENT-TREATED CHLOROPLASTS,
by Bessel Kok and Hans J. Rurainski. 16 Nov 64, 4p
AFOSR 65-1517 Unclassified report

Pub. in Biochimica et Biophysica Acta v94 p588-90 1965 (Copies available only to DDC users).

Descriptors: (*Photochemistry, Organic pigments), (*Organic pigments, Photochemistry), Oxidation, Reaction kinetics, Chlorophylls, Photosynthesis.

The time course was measured of the photo-oxidation of two concentrations of plastocyanin, 70% of which was in the reduced state at the beginning of the experiment. Despite a 4.5-fold concentration difference, the initial rate of photo-oxidation is equal in both cases. However, the time required for the conversion to be half completed is 4.5-fold longer in the case of high substrate concentration. These kinetics closely resemble those reported for cytochrome f and indicate that the rate is proportional to the ratio (plastocyanin) reduced/(plastocyanin) total. Data were also obtained by recording the time courses of plastocyanin photo-oxidation for two light intensities. The saturation rate as well as quantum yield of the process are proportional to the fraction of the substrate in the reduced form. The most reasonable explanation remains that in photosynthesis, plastocyanin and cytochrome f function 'in parallel', both donating to Photosystem I electrons generated in the second, O2-evolving, photo-act. (Extracted)

AD-619 230 Div. 16/1, 16/12

Eye Research Foundation, Bethesda, Md.
THE GEOMETRICAL ANALYSIS OF THE PHOTOPIC CORNEAL ERG. I. ON- AND OFF-RESPONSES,
by Robert H. Peckham and William M. Hart.
19 Oct 60, 12p
Contract Nonr275000, Proj. NR140 130
Unclassified report

Pub. in Exp. Eye Res. v1 p5-13 1961
(Copies available only to DDC users).

Descriptors: (*Cornea, Adaptation(Physiology)), (*Vision, Amphibians), Eye, Retina, Stimulation, Brightness, Optic nerve, Mathematical analysis, Geometry, Statistical analysis, Probability.

The corneal ERG of the response to a photopic stimulus in the frog shows five potential changes: to ON, a small rapid negative (I), a large rapid positive (II), and a slow negative (III); to OFF, a large rapid positive (IV) and a slow negative (V). When stimulus intervals are sufficiently long, the negative potentials III and V return to the zero resting potential. The temporal course of these potentials can be expressed by probability functions, in which the voltage is analogous to the normal ordinate, and the time analogous to the normal deviate. An example is developed for the condition of alternation between 8500 lux and total darkness at 2500 milliseconds of each, which shows excellent agreement between the empirical CRT trace and the derived geometrical pattern. The electronic equipment, including preparation of electrodes, the effect of filtering the amplification system, and the specifications of the stimulator are discussed. (Author)

AD-619 235 Div. 16/4, 16/1

California Univ., Los Angeles.
EXPERIMENTAL ANALYSIS OF THE VISUAL SYSTEM OF THE FOUR-EYED FISH ANABLEPS MICROLEPIS,
by Horst O. Schwassmann and Lawrence Kruger.
15 Jan 65, 15p
Contract Nonr438400; Grant PHS B4578, Proj. NR301 790
Unclassified report

Pub. in Vision Research v5 p269-281 1965 (Copies available only to DDC users).

Descriptors: (*Fishes, Vision), (*Vision, Fishes), Eye, Retina, Visual acuity, Nerve cells, Ganglia, Thresholds(Physiology), Adaptation(Physiology), Morphology(Biology), Optical images, Light, Refraction.

Specialization of optical structures in the Anableps eye

allows simultaneous vision in air and water in two different optical axes. The tectal projection of the aerial and aquatic visual field was mapped by electrophysiological methods and was found to be similar to that in freshwater fishes, except for an area above the waterline with greatly enlarged tectal magnification in Anableps, correlated with increased ganglion cell density in the corresponding retinal region. Size threshold for movement perception is lower in the aerial visual field than in the aquatic field and seems correlated with higher cone density in the ventral retina. Finger-like iris flaps between the two pupillary apertures prevent double-image formation due to light refraction at the waterline. (Author)

AD-619 280 Div. 29/2, 16/2
CFSTI Prices: HC$2.00 MF$0.50

Midwest Research Inst., Kansas City, Mo.
EVALUATION OF FREEZE-DRIED CHICKEN: EFFECTS OF COOKING AND DEBONING METHODS ON COSTS AND QUALITY.
Final rept. for 7 Jun 63-6 Jun 64,
by F. E. Wells. May 65, 40p
Technical rept. no. FD-10
Contract DA19 129AMC116N, Proj. 784 06 033
Unclassified report

Descriptors: (*Freeze drying, Chickens), (*Meat, Freeze drying), Production, Preparation, Costs, Quality control, Food, Biological contamination, Bacteria, Culture media, Storage, Taste, Tests.

Effects of three deboning techniques with three classes of poultry were studied. Evaluations were based upon cost of production, contamination by bacteria and organoleptic tests for quality of the dried meat. The results indicate there is reason to recommend a deboning procedure where carcasses are fully cooked before deboning. Fowl appear to give better meat yields than fryers or roasters. A method for bacteriological examination is described. Cautions concerning sanitation in relation to deboning methods are noted. (Author)

AD-619 283 Div. 16/4, 2/9
CFSTI Prices: HC$4.00 MF$0.75

American Museum of Natural History, New York.
REVIEW OF MARINE BIO-ACOUSTICS. STATE OF THE ART: 1964.
Phase rept. no. 1,
by William Tavolga. Feb 65, 108p
Contract N61339 1212, Proj. 7561, Task 7561 2
NAVTRADEVCEN 1212-1
Unclassified report

Descriptors: (*Marine biological noise, Reviews), Aquatic animals, Invertebrates, Fishes, Cetacea, Acoustics, Behavior, Sound signals, Sound transmission, Hearing, Marine biology, Spectroscopy.

The available information and literature on marine animal sounds is surveyed, review and evaluated. A brief historical review lists some of the major contributions to the field from the early 19th century to date, and a general non-technical survey covers the contribution of marine animals to ambient sea noise and the sounds of marine invertebrates, fishes and cetaceans. A detailed technical review summarizes and evaluates the literature on: mechanisms of sound production in marine animals, including a discussion on the physics of swim bladders as acoustic transducers; the characteristics of marine animal sounds; auditory capacities of marine animals; and the biological and behavioral significance of marine animal sounds. The problems of identification and classification of unknown sound sources are discussed. Examples of sonic mechanisms and spectrograms of the sounds are illustrated. (Author)

AD-619 284 Div. 16/1, 28/3
CFSTI Prices: HC$2.00 MF$0.50

Republic Aviation Corp., Farmingdale, N. Y.
COLLECTION AND ANALYSIS PROCEDURES FOR PHYSIOLOGICAL DATA: METHODOLOGY AND APPARATUS.
Final rept.,
by J. M. Peters, Irving Axelrod, and G. A. Albright.
18 May 65, 29p
Contract N61339 1444, Proj. 7709
NAVTRADEVCEN 1444-1
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Physiology, Electronic recording systems), (*Psychophysiology, Electronic recording systems), Measurement, Data, Analysis, Computers, Psychology, Psychomotor tests, Electrocardiography, Galvanic skin response, Respiration.

A technique for collecting, storing and analyzing physiological data is presented with a discussion of the apparatus involved. The technique permits straightforward correlation of psychomotor with physiological data. (Author)

AD-619 311 Div. 16/1, 30/2
CFSTI Prices: HC$3.00 MF$0.75

Philco Corp., Blue Bell, Pa.
A STUDY TO INVESTIGATE THE FEASIBILITY OF UTILIZING ELECTRICAL POTENTIALS ON THE SURFACE OF THE SKIN FOR CONTROL FUNCTIONS.
Final rept.,
by Lee Harrison, III. 1 Jul 64, 65p
Rept. no. 2386
Contract Nonr429200 Unclassified report

Descriptors: (*Muscles, Electronic recording systems), (*Biophysics, Data processing systems), Skin, Physiology, Control systems, Nerve impulses, Computers, Programming(Computers), Functions, Statistical analysis, Feasibility studies.

The report describes the successful application of non-deterministic, statistical recognition techniques to myographic signal patterns to study the feasibility of using electromyographic potentials for control applications. A description of the physiology of the source of electromyographic phenomena is reviewed. Efforts taken to find meaningful parameters within the signals are presented. The phenomenological variables and the necessity of using powerful recognition techniques are discussed and procedures of this investigation are presented. The Multinorm Computer Program and the new developments in data-taking equipment (Myocoder) are described. The results to date along with a projection of future efforts and a discussion of the uses of electromyography in control are given. (Author)

AD-619 318 Div. 16/10, 16/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
STUDY OF THE BLOOD PROTEIN BY THE ELECTRO

PHORETIC FRACTIONIZATION METHOD OF CHRONIC DISEASES OF THE MOUTH,
by P. N. Andrianov. 28 Jul 65, 13p
Rept. no. FTD-TT-65-533
TT 65-62923

Unclassified report

Unedited rough draft trans. of Stomatologiya (USSR) v40 n6 p14-9 1961.

Descriptors: (*Blood proteins, Electrophoresis), (*Histamine, Blood serum), (*Mouth, Diseases), Gastrointestinal system, Herpatic visuses, Infections, Diagnosis, Diamwe oxidase, Capillaries, Permeability, USSR.

Patients with chronic gingivitis and alveolar pyorrhea suffering simultaneously from gastric-intestinal illnesses, showed an increased content of histamine in the blood serum (from 9 to 18 gamma %). (2) Patients with aphthosis relapsing stomatitis and multiform exudative erythema showed a sharply increased histamine content in the blood (from 10.3 to 31 gamma %). (3) The high histamine level in the examined patients were accompanied by a low or reduced histaminase activity. (4) The cutaneous histamine test appears to be one of the test to determine permeability of capillaries and offers to a certain extent an idea about the histamine content in the organism. (Author)

AD-619 329 Div. 16/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
EFFECT OF GAMMA-RAYS AND VIBRATION ON THE PHYSICO-CHEMICAL PROPERTIES OF RED BLOOD CORPUSCLES,
by Yu. A. Kriger and E. A. Sverdlova. 5 Aug 65, 10p Rept. no. FTD-TT-65-585
TT 65-62935

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady, v160 n3 p713-6 1965.

Descriptors: (*Radiation effects, Erythrocytes), (*Erythrocytes, Radiation effects), (*Vibration, Erythrocytes), Gamma rays, Radiological dosage, Hematocrit, Chemical properties, Dielectric properties, Osmosis, Electrolytes(Physiology), Physiology, USSR.

AD-619 335 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
BACTERICIDAL AEROSOLS AND THEIR FUTURE USE FOR DISINFECTION IN THE ARMED FORCES,
by S. D. Belokhvostov. Jun 65, 10p
Translation-1396
TT 65-62941

Unclassified report

Trans. of Voenno-Meditsinskii Zhurnal (USSR) n8 p57-62 1962.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Military medicine, Germicides), (*Germicides, Aerosols), Armed forces(Foreign), Clothing, Spores, Tests, Liquids, USSR.

Conclusions: The aerosol method of treatment is one of the most productive and economical methods of chemical disinfection and should find wide application in the armed forces. It is recommended that the fine particle wet treatment of surfaces be introduced with the help of pneumatic guns or other more simple devices. Further urgent searches are necessary for improving the means and regimens of aerosol disinfection applicable to specific conditions and objects of disinfection. (Author)

AD-619 336 Div. 16/7
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
TOWARD THE ALL-UNION CONGRESS OF EPIDEMIOLOGISTS, MICROBIOLOGISTS AND INFECTIOUS DISEASE SPECIALISTS (14th).
Jun 65, 6p Translation-1386
TT 65-62942

Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v41 n1 p3-5 1964.

Descriptors: (*Medical personnel, USSR), (*Scientific organizations, USSR), Communism, Medical research, Microbiology, Biology, Epidemiology, Infectious diseases.

AD-619 338 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
STUDY OF THE DISTRIBUTION OF PSEUDOTUBERCULOSIS BACTERIOPHAGE IN NATURE. COMMUNICATION I. ISOLATION OF BACTERIOPHAGE FROM THE ORGANS OF RODENTS,
by N. M. Somova and N. A. Sergeeva. Jun 65, 14p
Translation-1398
TT 65-62944

Unclassified report

Trans. of Gosudarstvennyi Nauchno-Issledovatel'skii Protivochumnyi Institut. Trudy (USSR) v15 n1 p173-81 1959.

Descriptors: (*Bacteriophages, Rodents), Disease vectors, Ecology, Vaccines, Antigens + antibodies, Culture media, Pasteurella, USSR.

During an investigation of the organs of 998 rodents, 36 strains of bacteriophage (3.6%) were isolated that lysed pseudotuberculosis cultures. The bacteriophage was detected in the organs of gray rats (3.8%), house mice, (2.6%), voles and common shrews. The data obtained confirms the fact that the finding of bacteriophage has great importance in antiepidemic work. The bacteriophage is an indicator specifying the infectious state of a given territory in respect to the microbe causing an epizootic in rodents.

AD-619 340 Div. 16/14, 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
CONCERNING INFECTIOUS GASTROENTERITIS OF PIGS,
by V. V. Nikolskii. Jun 65, 7p Translation-1401
TT 65-62946

Unclassified report

Trans. of Veterinariya (USSR) v38 n9 p30-3 1961.

Descriptors: (*Gastrointestinal system, Infectious diseases), (*Swine, Gastrointestinal system), (*Infectious diseases, Swine), Etiology, Bacteria, Toxins + antitoxins, Enterobacteriaceae, Pathology, Convalescence, USSR.

AD-619 341 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
FURTHER EXPERIMENTAL STUDY ON THE EFFECTIVENESS OF CHEMICAL ANTHRAX VACCINE,
by N. I. Aleksandrov, N. E. Gefen, Yu. S. Voronin, Yu. V. Ezepchuk, and M. B. Kozyrev. Jun 65, 9p
Translation-1407
TT 65-62947

Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v41 p45-50 1964.

Descriptors: (*Bacillus anthracis, Vaccines), (*Vaccines, Bacillus anthracis), Effectiveness, Antigens + antibodies, Immunity, Dosage, Rabbits, Monkeys, USSR.

Conclusions: In tests on rabbits the significant effectiveness was shown for the chemical anthrax antigen with a various frequency of immunization and the administration of small doses of antigen (10 mg). In tests on monkeys the principal possibility was shown for obtaining, with the help of the anthrax antigen, a somewhat more intense immunity than by immunization with live STI vaccine. (Author)

AD-619 356 Div. 16/11, 16/3

Harvard Univ., Cambridge, Mass.
EFFECTS OF TRICYANO-AMINO-PROPENE ON METABOLISM OF ISOLATED CEREBRAL TISSUE,
by Jack H. Mendelson and Maryanna Warmoth.
1962, 6p
Contract Nonr186641

Unclassified report

Pub. in Nature v198 n4886 p1202-3 22 Jun 1963
(Copies available only to DDC users).

Descriptors: (*Organic nitrogen compounds, Pharmacology), (*Cerebral cortex, Metabolism), Nitriles, Amines, Alkenes, Drugs, Tissues(Biology), Respiration, Phosphates, Esters, Enzymes, Proteins, Synthesis.

The aim of this experiment was to determine if tri-a-p had an effect on respiration and high-energy phosphate ester concentration in cerebral tissue. It was postulated that the changes in enzyme activity and protein synthesis reported by Egyhazi and Hyden would be associated with alteration of cerebral oxidative metabolism.

AD-619 357 Div. 16/1, 16/3

Washington Univ., Seattle. School of Medicine.,
THYROID FUNCTION TESTS,
by J. Thomas Dowling. 1964, 10p
Contract DA49 143MD2420; Grant PHS AM05725

Unclassified report

Pub. in Northwest Medicine v63 p777-85 Nov 1964
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Thyroid hormones, Tracer studies), (*Metabolism, Thyroid hormones), (*Iodine, Metabolism), Radioactive isotopes, Labeled substances, Thyroxine, Thyroid gland, Pathology, Diagnosis, Tests.

Principal determinants of protein bound iodine 131 are: radioiodine uptake, the amount of hormone in the thyroid gland, and its rate of release into the circulation. Uptake of I 131 is not affected in acute thyroiditis, is diminished in subacute thyroiditis, and may be increased or decreased in chronic thyroiditis. Normal rate of hormone turnover is 50 micrograms per day but in thyrotoxicosis the rate may reach several hundred micrograms per day. The reverse is true in myxedema. Thyroxine is transported by being bound to thyroxine binding globulin but the binding activity of the protein may be abnormal. All of these elements of iodine metabolism may be utilized in tests employing radioactive iodine. Together with other tests and clinical observation, isotope tests have markedly increased the accuracy of diagnosis. (Author)

AD-619 365 Div. 16/2, 16/10

Armed Forces Inst. of Pathology, Army Medical Center, Washington, D. C.
BURULI (MYCOBACTERIAL) ULCERATION IN UGANDA (A NEW FOCUS OF BERULI ULCER IN MADI DISTRICT, UGANDA).
Rept. of a Field Study,
by H. F. Lunn, D. H. Connor, N. E. Wilks, G. R. Barnley, and F. Kamunvi. 15 Jan 65, 15p
Grant DA MD49 193 63G101

Unclassified report

Pub. in the East African Journal p275-88 Jun 1965
(Copies available only to DDC users).

Descriptors: (*Epidemiology, Africa), (*Ulcers, Mycobacterium), (*Mycobacterium, Ulcers), Skin, Necrosis, Etiology, Ecology, Medican examination, Diagnosis, Diseases, Disease vectors, Pathology.

This investigation supports, in a striking way, the view that there is an association between the river Nile and Buruli ulcer patients. It is now apparent that this association exists throughout the course of the river in Uganda and it becomes more significant when one consults a population map. The Buruli ulcer areas are areas of low relative population density. It seems reasonable, therefore, that hypotheses, developed for future epidemiological investigations, conform to this observation. Our efforts to relate Buruli ulcer directly with the river have been unsuccessful. It may be that the Nile plays an indirect role by moderating climatic and dermal temperatures within limits favourable to the organism. Further temperature data are being collected. (Author)

AD-619 384 Div. 16/1
CFSTI Prices: HC$5.00 MF$1.25

Foreign Technology Div., Wright-Patterson AFB, Ohio.
SECOND GROUP SPACE FLIGHT, AND CERTAIN RESULTS OF FLIGHTS OF SOVIET COSMONAUTS ON THE 'VOSTOK' SHIPS,
ed. by N. M. Sisakyan. 18 Aug 65, 197p
Rept. no. FTD-MT-65-256
TT 65-62984

Unclassified report

Edited machine trans. of mono. Vtoroi Gruppovoi Kosmicheskii Polet, i Nekotorye Itogi Poletov Sovetskikh Kosmonavtov na Korabyakh 'Vostok', Moscow, 1965 p1-228.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Space medicine, USSR), (*Astronauts, Space medicine), Space flight, Manned, Life support, Closed ecological systems, Safety devices, Pressure suits, Medical examination, Psychology, Physical fitness, Vestibular apparatus, Cardiovascular system, Respiration, Galvanic skin response, Weightlessness, Stress(Physiology), Tolerances(Physiology).

Contents: General conditions of flight and flight assignment; Physiological-hygienic appraisal of the life-support systems and safety measures; Air regeneration and conditioning in the cabins of ship-satellites; Hygienic appraisal of clothes donned under pressure suit; Feeding and water supply; Medical control of physical preparation of cosmonauts; Investigation with creation of brief weightlessness on an aircraft; Investigations on a centrifuge; Investigation of vestibular reactions; Influence of high temperatures; Psychological investigations in conditions of isolation; Working activity of the cosmonauts; Results of Investigations in Flight; Postflight Medical Inspection of Cosmonauts.

AD-619 394 Div. 16/1, 30/2
CFSTI Prices: HC$4.00 MF$1.00

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
COMPUTER SIMULATION OF VISUAL DATA PROCESSING IN THE HUMAN BRAIN.
Master's thesis,
by Donald LaMarr Ockerman. Jun 65, 122p
Rept. no. GGC/EE/65-10 Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Bionics, Vision), (*Vision, Pattern recognition), (*Pattern recognition, Cerebral cortex), Brain, Data processing systems, Computers, Models-(Simulations), Programming(Computers), Eye, Retina, Physiology.

The operation of the visual portion of the human brain has been simulated on the IBM-1620 and IBM-7094 digital computers. The simulation is designed using the cross-correlation method postulated by Dr. Kabrisky. The simulation is very coarse as the grain size of the visual area of the human brain is four hundred times finer than the computer model. The model stores new patterns, standardizes pattern sizes, rotates the input pattern and recognizes identical or similar patterns. The model is evaluated by inserting twenty test patterns. The model did seem to simulate the human visual recognition system for these input patterns. The model will recognize patterns that are reduced, enlarged, shifted, or rotated. After analyzing the satisfactory results recommendations are made for the design of larger and more intricate models. The computer programs and sample results are included in the Appendixes. (Author)

07. Chemistry

AD-618 774 Div. 4/3, 22/1

Canadian Armament Research and Development Establishment, Valcartier (Quebec).
SYNTHESIS OF SOME TETRAZOLE SALTS,
by Meude Tremblay. 4 Nov 64, 4p
Unclassified report

Pub. in Canadian Journal of Chemistry v43 p1230-2 1965 (Copies available only to DDC users).

Descriptors: (*Explosive materials, Synthesis(Chemistry)), (*N-heterocyclic compounds, Synthesis(Chemistry)), (*Guanidines, Synthesis(Chemistry)), Salts, Amines, Hydrogen compounds, Shock(Mechanics), Detonations, Spectra(Infrared), Molecular structure, Canada.

Guanidium 5-nitroaminotetrazole, formed by the condensation of guanidine carbonate and nitroguanylazide. This compound contains 4.5 moles of nitrogen per mole of carbon or oxygen. Aminoguanidinium 5-nitroaminotetrazole was formed from aminoguanidine bicarbonate and nitroguanylazide. Triaminoguanidinium 5-nitroaminotetrazole was obtained by the condensation of triaminoguanidine nitrate and potassium 5-nitroaminotetrazole. 5-Aminotetrazolyl-5'-nitroaminotetrazole was also obtained from 5-aminotetrazole nitrate and potassium 5-nitroaminotetrazole. These salts contained between 68 and 73% nitrogen, and by decomposition, liberated large volumes of hydrogen, nitrogen, and carbon monoxide. Their shock sensitivity varied from 30 cm/2 kg for aminoguanidinium 5-nitroaminotetrazole to 8 cm/2 kg for triaminoguanidinium 5-nitroaminotetrazole. The infrared spectra of nitroaminotetrazole salts of aminoguanidine, triaminoguanidine, and aminotetrazole have shown the presence of tetrazole rings together with the functional groups present in the individual guanidines. (Extracted)

AD-618 806 Div. 4/3

Prairie Regional Lab., Saskatoon, (Saskatchewan).
TRIDENTATE COMPLEXES OF PERIODATE AND SOME FURANOSE DERIVATIVES,
by A. S. Perlin and E. von Rudloff. 4 Mar 65, 7p
NRC 8474
Unclassified report

Pub. in Canadian Journal of Chemistry v43 p2071-7 1965 (Copies available only to DDC users).

Descriptors: (*Glycosides, Complex compounds), (*Carbohydrates, Complex compounds), (*Iodates, Complex compounds), (*Complex compounds, Carbohydrates), Glycols, Oxidation, Decomposition, Stabilization, Nuclear magnetic resonance, Ions, Monocyclic compounds, Canada.

1,2-O-Isopropylidene-alpha-D-glucofuranose (I) is highly resistant to glycol scission by periodate in alkaline solution. This atypical effect is caused by preferential formation of a stable periodate complex. Proton magnetic resonance spectroscopy shows that the 3-, 5-, and 6-protons of I (and the 3- and 5-protons of I-6,6'-d2) become strongly deshielded during this process, which, together with accompanying changes in proton-proton coupling, establishes that the complex (II) has a 3,5,6-tridentate structure. Variations in the stability of II with pH suggest that it can exist either as a monoanion or dianion. A complex analogous to II is formed by ethyl alpha-D-thioglucofuranoside, whereas methyl beta-D-galactofuranoside forms a complex that probably has the 2,5,6-structure. The characteristics of these tridentate complexing reactions support the general concept that a five-membered cyclic complex is a transient intermediate of a-glycol oxidation by periodate. (Author)

AD-618 807 Div. 4/3, 4/4

Atlantic Regional Lab., Halifax (Nova Scotia).
THE ALCOHOLYSIS OF TRIALKYLALKOXYSILANES. PART II. THE PREPARATION AND CHEMISTRY OF METHYL 2,3,4-TRI-O-TRI-METHYLSILYL-ALPHA-D-GLUCOPYRANOSIDE,
by D. T. Hurst and A. G. McInnes. 29 Jan 65, 9p
NRC 8432
Unclassified report

Pub. in Canadian Journal of Chemistry v43 p2004-11 1965 (Copies available only to DDC users).
See also AD-618 808.

Descriptors: (*Silanes, Decomposition), (*Glycosides, Synthesis(Chemistry)), Catalysts, Molecular structure, Spectra(Infrared), Nuclear magnetic resonance, Molecular isomerism.

The trimethylsilyl group on the 6-position of methyl 2,3,4,6-tetra-O-trimethylsilyl-alpha-D-glucopyranoside is preferentially removed by methanolysis, using basic or acidic catalysts, giving methyl 2,3,4-tri-O-trimethylsilyl-alpha-D-glucopyranoside in high yield (>80%). Reaction of the latter with acetic anhydride, benzoyl chloride, or phenyl isocyanate produces the corresponding 6-substituted derivatives in quantitative yield. The trimethylsilyl residues from the latter compounds are hydrolyzed by 50% aqueous methanol with the concomitant formation of 6-O-acetyl, 6-O-benzoyl, or 6-carbanilate derivatives of methyl alpha-D-glucopyranoside in excellent yield. Chemical and proton magnetic resonance (p.m.r.) studies established the structure of methyl 2,3,4-tri-O-trimethylsilyl-alpha-D-glucopyranoside, and of subsequent derivatives prepared from this compound. Infrared and p.m.r. evidence is offered to support conclusions regarding the conformation of the groups or atoms attached to C6 and C5 of the glucoside residue in some of these compounds. (Author)

AD-618 808 Div. 4/3, 4/4

Atlantic Regional Lab., Halifax (Nova Scotia).
THE ALCOHOLYSIS OF TRIALKYLALKOXYSILANES. PART I. A KINETIC STUDY OF THE METHANOLYSIS OF METHYL 2,3,4,6-TETRA-O-TRIMETHYLSILYL-ALPHA-D-GLUCOPYRANOSIDE TO FORM METHYL 2,3,4,-TRI-O-TRIMETHYLSILYL-ALPHA-D-GLUCOPYRANOSIDE,
by A. G. McInnes. 29 Jan 65, 8p
NRC 8431
Unclassified report

Presented at the Annual Conference (47th) The Chemical Institute of Canada, Kingston, Ontario, Jun 1-3, 1964.
Pub. in Canadian Journal of Chemistry v43 p1998-2003 1965 (Copies available only to DDC users).

Descriptors: (*Silanes, Decomposition), (*Glycosides, Decomposition), Synthesis(Chemistry), Reaction kinetics, Catalysis, Heat of activation, Canada.

The selective methanolysis of the trimethylsilyl group on the primary 6-position of methyl 2,3,4,6-tetra-O-trimethylsilyl-alpha-D-glucopyranoside (I) to form methyl 2,3,4-tri-O-trimethylsilyl-alpha-D-glucopyranoside (II) is catalyzed by acid or base. In the latter case the reaction follows second-order kinetics in I and methoxide ion, and the rate of reaction is independent of the nature of the cation of the metal methoxide used to catalyze the

reaction. Successive replacement of the methyl hydrogens in the methoxide ion by methyl groups is accompanied by a corresponding decrease in the rate of reaction. The rate constant for removal of trimethylsilyl groups at the secondary 2-, 3-, and 4-positions of I and II is smaller by a factor of 25 than for removal of the corresponding group at the primary 6-position, and the energies of activation for the two processes are 10.8 and 9.1 kcal/mole. (Author)

AD-618 809 Div. 4/3

Prairie Regional Lab., Saskatoon (Saskachewan).
SYNTHESIS OF BETA-D-MANNOSE 1,2-ORTHOACETATES,
by M. Mazurek and A. S. Perlin. 4 Feb 65, 7p
NRC 8419

Unclassified report

Pub. in Canadian Journal of Chemistry v43 p1918-23 1965 (Copies available only to DDC users).

Descriptors: (*Hexoses, Synthesis(Chemistry)), (*Acetates, Synthesis(Chemistry)), Condensation reactions, Molecular isomerism, Nuclear magnetic resonance, Polarographic analysis, Canada.

Synthesis of 3,4,6-tri-O-acetyl-beta-D-mannopyranose 1,2-orthoacetates (I) from 2,3,4,6-tetra-O-acetyl-alpha-D-mannopyranosyl bromide (II) and various alcohols in the presence of pyridine and substituted pyridines is described. 2,6-Lutidine is a particularly effective acid acceptor in these condensations, and the use of chloroform as a diluent is advantageous. The lutidine-buffered system has afforded a good yield of orthoacetate (I) with several alcohols that barely react with II in the presence of silver ion; this difference is attributed to the dominance of side reactions under the latter conditions. The N-bases also promote a more highly stereo-selective orthoester synthesis than does the silver-catalyzed reaction, leading to formation of the OR-exo-diastereoisomer almost exclusively. (Author)

AD-618 810 Div. 4/4, 9/1

National Research Council of Canada, Ottawa (Ontario). Div. of Pure Chemistry.
THE FLOW OF GASES THROUGH MICROPOROUS CARBON,
by R. F. Bartholemew and E. A. Flood. 14 Dec 64, 7p Rept. no. NRC-8451

Unclassified report

Pub. in Canadian Journal of Chemistry v43 p1968-72 1965 (Copies available only to DDC users).

Descriptors: (*Carbon, Gas flow), (*Porous materials, Gas flow), Helium, Argon, Nitrogen, Krypton, Methane, Butane, Aliphatic compounds, Vinyl plastics, Laminar flow, Viscosity, Equations, Adsorption, Films, Canada.

Flow rates of He, Ar, N2, Kr, methane, propane, and n-butane through a small circular cylinder of microporous 'saran' carbon at 25C were measured. The corresponding adsorption isotherms were also measured. The experimental results are reported. The observed flow rates of propane and butane are compared with those calculated by means of a theoretical equation deduced previously. The theoretical equation is based on a laminar viscous flow of liquid-like films and correlates flow rates with pore dimensions and adsorption isotherms. (Author)

AD-618 811 Div. 4/4

National Research Council of Canada, Ottawa (Ontario). Div. of Pure Chemistry.
THE REACTION OF ACTIVE NITROGEN WITH MIXTURES OF ETHYLENE AND NITRIC OXIDE,
by E. Fersht and R. A. Back. 3 Dec 64, 7p
Rept. no. NRC-8406

Unclassified report

Presented at the Chemical Institute of Canada Annual Conference at Kingston, Jun 64.
Pub. in Canadian Journal of Chemistry v43 p1899-1904 1965 (Copies available only to DDC users).

Descriptors: (*Nitrogen, Chemical reactions), (*Alkenes, Chemical reactions), (*Nitrogen compounds, Chemical reactions), Electric discharges, Atomic energy levels, Excitation, Mixtures, Hydrogen compounds, Cyanides, Diatomic molecules, Stable isotopes, Canada.

The reaction of active nitrogen, produced in a condensed discharge at 1 mm pressure, with mixtures of ethylene and nitric oxide was studied with mixtures ranging in composition from pure ethylene to pure nitric oxide. The sum of HCN + 14N15N produced from mixtures of C2H4 and 15NO remained constant and equal to the HCN produced from pure C2H4 for NO concentrations up to 50 mole %. As more NO was added, this sum rose towards the value of 14N15N produced from pure 15NO. These data appear to lend support to the HCN yield from ethylene as the true measure of nitrogen atom concentration. It is suggested that 15NO also undergoes a concerted reaction with excited 14N14N molecules to produce 14N15N, and that these excited molecules can be quenched by collision with ethylene or methane without consuming nitrogen or forming HCN. (Author)

AD-618 813 Div. 4/3

National Research Council of Canada, Ottawa (Ontario). Div. of Pure Chemistry.
THE STRUCTURE OF RETAMINE AND THE PARTIAL SYNTHESIS OF THE (--)-ENANTIOMORPH,
by Kju Hi Shin, L. Fonzes, and Leo Marion.
3 Mar 65, 7p Rept. no. NRC-8459

Unclassified report

Pub. in Canadian Journal of Chemistry v43 p2012-16 1965 (Copies available only to DDC users).

Descriptors: (*Alkaloids, Molecular structure), N-heterocyclic compounds, Molecular isomerism, Molecular rotation, Synthesis(Chemistry), Chromatographic analysis, Nuclear magnetic resonance, Spectra(Infrared), X-ray diffraction analysis, Canada.

Previous work by many authors has led to the assumption that retamine might be (+)-12-hydroxysparteine. A partial synthesis of the enantiomorph of this compound was effected by dehydration of (+)-13-hydroxylupanine and hydroboration of the product. The dehydration product consisted of two components that were separated by thin-layer chromatography and identified by the characteristics of their nuclear magnetic resonance (n.m.r.) spectra as delta 12,13- and delta 13,14-dehydrolupanine. Hydroboration of the delta 12,13-isomer gave rise to (-)-12 hydroxysparteine having, in thin-layer chromatography, the same Rf value as natural retamine and the same optical rotation numerically, although of opposite sign. The synthetic base had the same infrared and n.m.r. spectra as the alkaloid and the two had superimposable Debye-Scherrer patterns. Evidence is given showing the hydroxyl to be equatorial. (Author)

AD-618 814 Div. 4/3

Prairie Regional Lab., Saskatoon, (Saskatchewan).
ACETONATION OF ALDOSE DIETHYL THIOACETALS,
by P. A. J. Gorin. 2 Feb 65, 8p
NRC 8478

Unclassified report

Pub. in Canadian Journal of Chemistry v43 p2078-84 1965 (Copies available only to DDC users).

Descriptors: (*Monosaccharides, Substitution reactions), (*Hexoses, Substitution reactions), (*Organic sulfur compounds, Substitution reactions), Catalysts, Ketones, Lactones, Chromatographic analysis, Canada.

Acetonation of hexose diethyl thioacetals using copper sulphate catalyst gave rise to 5,6-O-substituted products. The exception was D-galactose diethyl thioacetal, which underwent some 4,5-O-substitution. D-Threose and 2,3-di-O-methyl-D-galactose diethyl thioacetals also underwent predominant alpha-terminal substitution although some beta-terminal substitution took place, particularly with the latter thioacetal. Acetone-sulphuric acid caused preferential alpha-T acetonation of D-threose and 2,3-di-O-methyl-D-galactose diethyl thioacetals. The product from D-threose diethyl thioacetal contained 90% of the 2,3-O-isopropylidene and 10% of the 3,4-O-isopropylidene derivatives. D-Glucurono-delta-lactone diethyl thioacetal in acetone-sulphuric acid acetonated mainly on the 2,4- positions although a smaller proportion of 4,5-O-isopropylidene derivative was present. (Author)

AD-618 826 Div. 4/4, 25/5

University of Southern California, Los Angeles. Engineering Center.
ON THE TOTAL FORCE OF ELASTIC SCATTERING. NEUTRAL PARTICLES AND PERFECT CRYSTAL,
by E. Beder. 9 Sep 63, 39p
Grant AF AFOSR55 63, Proj. 9783, Task 978301
AFOSR 65-1154

Unclassified report

Pub. in Surface Science v1 p242-79 1964 (Copies available only to DDC users).

Descriptors: (*Elastic scattering, Atoms), (*Quantum mechanics, Kinetic theory), (*Surface properties, Crystals), (*Force(Mechanics), Adsorption, Dielectrics, Particle trajectories, Potential theory, Perturbation theory.

Quantum and classical-mechanical microscopic theories are developed for the total force on a cold solid plane surface resulting from the elastic scattering of an incident uniform cold beam of particles. The solid is a semi-infinite perfect dielectric crystal. The particles are neutral noninteracting mass points. The particle-solid interaction potential is that of physical adsorption normal to the surface, with a small sinusoidal perturbation along the surface to represent crystal nuclei. With vanishing perturbation the scattering becomes purely specular. For conceptual simplicity the two-dimensional problem is treated with a square-well interaction potential. Particle energy and incidence effects are studied. The quantum-mechanical forces are shown to be specular at very high energies (particle deBroglie wave length lambda approaches 0), and in a domain of low energies (lambda > d). Between these limits some points are computed for helium incident on LiF to show a domain of 'strong diffraction' or significantly nonspecular tangential forces. The quantum theory is shown to be essential in this domain and below where the classical theory fails. (Author)

AD-618 830 Div. 4/4, 4/3

Harvard Univ., Cambridge, Mass. Dept. of Chemistry.
ELECTROCHEMICAL GENERATION OF FREE RADICALS AND THEIR STUDY BY ELECTRON SPIN RESONANCE SPECTROSCOPY; THE NITROBENZENE ANION RADICAL,
by David H. Geske and August H. Maki. 27 Oct 59, 6p
Grants NSF G7289, NSF G7288

Unclassified report

Pub. in Journal of the Americal Chemical Society v82 p2671-6 1960 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Nitrobenzenes, Free radicals), (*Free radicals, Electrochemistry), (*Microwave spectroscopy, Free radicals), Nuclear magnetic resonance, Absorption spectrum, Electrolysis, Organic solvents, Organic nitrogen compounds, Hyperfine structure, Chemical bonds, Nuclear moments.

The nitrobenzene anion radical, (.C6H5NO2)(-), was prepared by constant potential electrolysis of nitrobenzene solutions at a mercury pool electrode placed directly inside the microwave cavity of an electron spin resonance spectrometer. Acetonitrile was used as a solvent with tetra-n-propylammonium perchlorate as supporting electrolyte. Well-resolved electron spin resonance spectra of the radical reduction product exhibit a hyperfine structure consisting of fifty-four components. Hyperfine coupling constants were assigned for the interaction of the unpaired electron with the various ring protons and the nitrogen nucleus. The odd electron distribution in the molecule is seen to be at least qualitatively in agreement with that predicted by conventional valence bond theory. The large hyperfine interaction with the nitrogen nuclear moment is presumed to arise from a sigma-pi exchange interaction on the nitrogen atom. Electrochemical generation in acetonitrile offers advantages over conventional alkali metal reductions in solvents such as tetrahydrofuran and 1,2-dimethoxyethane. (Author)

AD-618 834 Div. 4/4, 4/3

Harvard Univ., Cambridge, Mass. Dept. of Chemistry.
ELECTRON SPIN RESONANCE AND POLAROGRAPHIC INVESTIGATION OF SUBSTITUTED NITROBENZENE NEGATIVE IONS,
by August H. Maki and David H. Geske.
29 Sep 60, 9p
Grants NSF G7288, NSF G7289

Unclassified report

Pub. in Journal of the American Chemical Society v83 p1852-1860 Apr 20 1961 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Nitrobenzenes, Free radicals), (*Free radicals, Nitrobenzenes), (*Microwave spectroscopy, Nitrobenzenes), (*Polarographic analysis, Nitrobenzenes), Nuclear magnetic resonance, Absorption spectrum, Ions, Electrochemistry, Reduction(Chemistry), Atomic orbitals, Hyperfine structure, Aldehydes, Fluorine compounds.

Electron spin resonance spectra were obtained for 14 para substituted nitrobenzene mononegative ions that were generated in acetonitrile solution by electrochemical reduction within a microwave cavity. Polarographic data were also obtained for these para substituents and for 8 meta substituents. An excellent linear correlation was found between the half-wave potentials for the meta substituents and sigma-n and sigma-o values. From gross deviation of p-nitro and p-amino substituents from the

meta correlation line, para resonance energies are estimated. The N14 coupling constant of the nitro group is found to decrease as the ease of reducing the parent molecule is increased by the para substitution and vice versa. Measurement of ring proton coupling constants leads to the conclusion that the total electron spin magnetization in the four central ring pi-orbitals is approximately constant. The para substituent merely effects a redistribution of the magnetization among these ring positions. Evidence based on hyperfine structure is presented for hindered rotation of the aldehyde group of para nitrobenzaldehyde anion, and a maximum rotational frequency of 2,800,000 c.p.s. is estimated. Comparison of the F19 hyperfine coupling constant of p-fluoronitrobenzene with the para proton coupling constant of nitrobenzene leads to the ratio F to H coupling constants = 2.12; from this ratio is estimated that Q-F = 47.5. (Author)

AD-618 837 Div. 4/2, 4/4

McGill Univ., Montreal (Quebec). Inorganic Chemistry Lab.,
THE RELATIVE ACCEPTOR POWER OF BORON TRIHALIDES AND BORANE TOWARD TRIMETHYLAMINE BY PROTON N.M.R. MEASUREMENTS,
by J. M. Miller and M. Onyszchuk. 29 Jan 64, 7p
Grant DRB9530 20, Proj. D46 95 30 20

Unclassified report

Pub. in Canadian Journal of Chemistry v42 p1518-23 1964 (Copies available only to DDC users).

Descriptors: (*Boranes, Complex compounds), (*Boron compounds, Halides), (*Nuclear magnetic resonance, Boron compounds), Protons, Heat of formation, Dipole moments, Spectra(Infrared), Canada.

Proton n.m.r. spectra of trimethylamine adducts of the boron trihalides and borane were measured in chloroform solution. Chemical shifts of methyl protons relative to tetramethylsilane decrease in the order: BBr3 > BCl3 > BH3 > BF3, suggesting that this is the order of acceptor activity toward trimethylamine. This is supported by the existence of a linear relationship between methyl proton chemical shifts and the heats of formation, dipole moments, or infrared vibrational shifts of boron trihalide and borane adducts. Splitting of methyl proton resonances into quarters have been observed for (CH3)3N.BCl3 and (CH3)3N.BBr3 but not for (CH3)3N.BF3 and (CH3)3N.BH3. (Author)

AD-618 879 Div. 4/3, 14/6
CFSTI Prices: HC$1.00 MF$0.50

Coating and Chemical Lab., Aberdeen Proving Ground, Md.
IDENTIFICATION OF HYDRIC COMPOUNDS BY COLOR REACTIONS.
Final rept.,
by Jules B. Counts. 14 Jul 65, 21p
Rept. no. CCL-182
Proj. 1C024401A109

Unclassified report

Descriptors: (*Alcohols, Colorimetric analysis), (*Glycols, Colorimetric analysis), (*Ethers, Colorimetric analysis), Sulfuric acid, Freezing point depressants, Fuels, Quantitative analysis, Chemical analysis, Fuel additives.

The color reactions of a wide range of alcohols, glycols and glycol-ethers with color forming reagents in the presence of sulfuric acid have been studied. Analytical applications and limitations are discussed. (Author)

AD-618 958 Div. 4/3

Pitman-Dunn Inst. for Research, Frankford Arsenal, Philadelphia, Pa.
UREA INCLUSION COMPOUNDS OF ALKENOIC ACIDS AND ALKYL ALKENOATES.
Technical research article,
by Jack Radell and Bruce W. Brodman. 11 Sep 64, 6p
Rept. no. A65-4
Proj. 1CO14501B13A

Unclassified report

Pub. in Canadian Journal of Chemistry v43 p304-5 1965 (Copies available only to DDC users).

Descriptors: (*Complex compounds, Preparation), (*Urea, Complex compounds), (*Carboxylic acids, Complex compounds), (*Fatty acid esters, Complex compounds), Molecular isomerism, Chemical bonds, Spectra(Infrared), X-ray diffraction analysis, Crystals.

A group of alkenoic acids and alkyl alkenoates were shown to be all trans from the infrared absorption spectra of the compounds. The ease with which each molecule could form a crystalline inclusion compound was determined from the X-ray powder diffraction patterns and from the shortest homologue of each of the families capable of forming an inclusion compound. The more centrally located the double bond was in the molecule, the more difficulty was encountered in forming an inclusion compound. The methyl and ethyl esters of the noncomplexing alkenoic acids formed crystalline inclusion compounds. (Author)

AD-618 959 Div. 4/3, 4/4

Pitman-Dunn Inst. for Research, Frankford Arsenal, Philadelphia, Pa.
X-RAY POWDER PATTERNS FOR THE IDENTIFICATION OF SOME n-ALKANONE SEMICARBAZONES.
Technical research article,
by Jack Radell, Bruce W. Brodman, and Kimball Kramer. 16 Dec 64, 7p Rept. no. A65-5
Proj. 1CO14501B13A

Unclassified report

Pub. in Canadian Journal of Chemistry v43 p1661-4 1965 (Copies available only to DDC users).

Descriptors: (*Ketones, X-ray diffraction analysis), (*Hydrazine derivatives, X-ray diffraction analysis), (*X-ray diffraction analysis, Ketones), Chemical bonds, Impurities.

The interplanar spacings obtained from the X-ray powder patterns of a series of structurally related semicarbazones were used to unequivocally identify the ketones from which the derivatives were prepared. The advantages of the proposed over the currently used melting points to identify the compounds were cited. The method was found to be applicable to slightly contaminated mixtures of semicarbazones. (Author)

AD-618 963 Div. 4/4, 4/3

Harvard Univ., Cambridge, Mass. Dept. of Chemistry.
ELECTRON SPIN RESONANCE STUDY OF P-PHENYLENE-DIAMINE POSITIVE ION,
by M. T. Melchior and A. H. Maki. 5 Jul 60, 6p
Grant NSF G7289

Unclassified report

Pub. in Journal of Chemical Physics v34 n2 p471-6 Feb 1961 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Free radicals, Microwave spectroscopy), (*Amines, Free radicals), (*Microwave spectroscopy, Free radicals), Nuclear magnetic resonance, Ions, Electrochemistry, Hyperfine structure, Organic solvents, Deuterated compounds, Aromatic compounds.

The mono-positive radical ion of p-phenylene diamine was prepared by controlled potential electrolysis and studied by electron spin resonance. This ion was formed in acetonitrile solution with sodium perchlorate as supporting electrolyte and the controlled potential electrolysis was carried out in the microwave cavity of the ESR spectrometer. The ion exhibits a complex hyperfine structure in dilute solution; the observed spectrum consists of about 75 hyperfine components. Isotropic hyperfine coupling constants were assigned for the three types of interacting nuclei: the aromatic ring protons, amine protons, and the nitrogen nuclei. The large nitrogen hyperfine interaction observed is in marked contrast to Wurster's Blue cation, for which this interaction is vanishingly small. ESR spectra of deuterated derivatives were obtained and employed in making the assignment. The magnitude of the nitrogen hyperfine interaction relative to that of the amine protons is shown to be consistent with the mechanism of pi-sigma electron exchange interaction on the nitrogen atom. Electrochemical generation allows the study of the relatively unstable ion-radical, whereas other methods of preparation have been less successful. (Author)

AD-618 969 Div. 4/4, 4/3

Harvard Univ., Cambridge, Mass. Dept. of Chemistry.
ELECTRON-SPIN RESONANCE OF ELECTROCHEMICALLY GENERATED FREE RADICALS ISOMERIC DINITROBENZENE MONONEGATIVE IONS,
by August H. Maki and David H. Geske. 15 Apr 60, 8p
Grant NSF G7289

Unclassified report

Presented at the 1960 Annual Meeting of the American Physical Society, New York, N. Y., January 27, 1960.
Pub. in Journal of Chemical Physics v33 n3 p825-32 Sep 1960.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Free radicals, Microwave spectroscopy), (*Nitrobenzenes, Free radicals), (*Microwave spectroscopy, Free radicals), Electrochemistry, Ions, Organic solvents, Hyperfine structure, Nuclear magnetic resonance, Polarographic analysis, Deuterated compounds, Synthesis(Chemistry), Atomic orbitals, Molecular isomerism.

The monomegative ions of meta-, ortho- and para-dinitrobenzene were prepared in acetonitrile by controlled potential electrolysis within a microwave cavity and their electron spin resonance observed. The radical spectra exhibit hyperfine structure due to the isotropic magnetic interaction of the unpaired electron with the nitrogen and ring proton nuclear moments. Coupling constants were obtained with the aid of deuterium substitutions in the parent molecule. The nitrogen hyperfine coupling constants for the isomeric meta, ortho, and para anions were found to be 4.68, 3.22, and 1.74 gauss, respectively, and were identical for each of the two nitrogen nuclei of a given radical. Proton coupling constants range between 0.42 gauss and 4.19 gauss. The larger total hyperfine width of the metal-dinitrobenzene anion compared with the ortho and para isomers is ascribed to the existence of negative spin density in the pi system of the first-mentioned radical and to the possibility of quinonoid resonance in the others which places considerable unpaired, spin density in the oxygen nonbonding orbitals. (Author)

AD-618 973 Div. 4/3, 4/4

Harvard Univ., Cambridge, Mass. Dept. of Chemistry.
AN INVESTIGATION OF THE REACTION PRODUCTS OF BIS-CYCLOPENTADIENYLTITANIUM DICHLORIDE AND VARIOUS ALUMINUM ALKYLS BY ELECTRON SPIN RESONANCE,
by August H. Maki and Edward W. Randall. 2 Jun 60, 2p

Unclassified report

Pub. in Journal of the American Chemical Society v82 p4109-10 1960 (Copies not available to DDC or Clearinghouse customers.

Descriptors: (*Aluminum compounds, Metalorganic compounds), (*Titanium compounds, Metalorganic compounds), (*Metalorganic compounds, Microwave spectroscopy), Nuclear spin resonance, Monocyclic compounds, Chlorides, Hyperfine structure, Molecular structure, Chemical bonds.

Bis-cyclopentadienyl titanium dichloride (I) was allowed to react with about a thousandfold excess of several aluminum alkyls in benzene solution and the electron spin resonance (e.s.r.) spectra of these solutions were observed at 3.2 cm. wave length and at 20C. The reactions with several aluminum alkyls were investigated: Me3Al, Et3Al, iso-Bu3Al, Et2AlCl, and EtAlCl2. The nature of the e.s.r. spectrum was found to depend upon the aluminum alkyl which was allowed to react with I. Furthermore, the e.s.r. spectrum of the EtAlCl2 system was found to change with time. The product of the reaction between Et3Al and I was shown to be the compound Cp2TiCl2AlEt2, which has one unpaired electron. The final products of the reactions based upon Et2AlCl and EtAlCl2 are most probably the compounds Cp2TiCl2AlEtCl and Cp2TiCl2AlCl2, respectively. The spectra indicate that more than one paramagnetic species is present. The compositions and structures of the products of systems based upon Me3Al and isoBu3Al are not known, but the formulations Cp2TiCl2AlR2 may well apply. (Extracted)

AD-618 989 Div. 4/4, 25/8, 14/8

Case Inst. of Tech., Cleveland, Ohio.
A THEORY OF THE THERMODYNAMIC BEHAVIOR OF NONELECTROLYTE SOLUTIONS. III. THE OSMOTIC PRESSURE OF POLYMER SOLUTIONS,
by Samuel H. Maron and Nobuyuki Nakajima.
27 Aug 59, 14p
Grant NSF G7290

Unclassified report

Pub. in Journal of Polymer Science v17 p327-40 1960
(Copies not available to DDC or Clearinghouse customers.)
See also AD-618 997.

Descriptors: (*Polymers, Thermodynamics), (*Styrene plastics, Solutions), (*Polyethylene plastics, Solutions), (*Osmotic pressure, Polymers), Theory, Equations, Organic solvents, Molecular weight.

Data on the osmotic pressures of both dilute and concentrated polystyrene and polyisobutylene solutions in various solvents were examined in terms of Maron's theory. It is shown that for each polymer-solvent system at a given temperature the behavior over the entire concentration range studied can be characterized by a single interaction parameter, mu, whose dependence on volume fraction, v2, of polymer is given by mu = mu-o + sigma-o(v2), where mu-o and sigma-o are constants. For two systems, where data are available, this linear

relationship was found to hold from v2 = 0 up to v2 =0.90. With this relationship for mu, Maron's theory leads to functional plots for dilute solutions which are linear even in systems where the usual II/C vs. C plots are not straight lines. These plots yield the molecular weights from the intercepts and the quantities (mu-o -- sigma-o) from the slopes. However, the individual values of mu-o and sigma-o cannot be obtained from the dilute solution data. To arrive at these, data are required at concentrations higher than those customarily used for molecular weight determinations. (Author)

AD-618 997 Div. 4/4, 25/8, 14/9

Case Inst. of Tech., Cleveland, Ohio.
A THEORY OF THE THERMODYNAMIC BEHAVIOR OF NONELECTROLYTE SOLUTIONS. II. APPLICATION TO THE SYSTEM RUBBER-BENZENE,
by Samuel H. Maron and Nobuyuki Nakajima. 13 Feb 59, 13p
Grant G7290

Unclassified report

Pub. in Journal of Polymer Science v40 p59-71 1959 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Polymers, Solutions), (*Rubber, Thermodynamics), Organic solvents, Aromatic compounds, Theory, Entropy, Mixtures.

The thermodynamic theory of nonelectrolyte solutions proposed by Maron was applied to the experimental data of Gee and Treloar on solutions of rubber in benzene at 25C. The theory was found to be capable of representing these thermodynamic data very satisfactorily on the basis of a constant interaction parameter, mu, and on the basis of the dependence of the heat of mixing on the derivative of mu with respect to temperature rather than mu itself. Further, by assuming the heat of mixing to be temperature independent, an expression was set up for mu as a function of the volume fraction and the temperature. This equation reproduces the partial molal free energy values measured at 100C with an accuracy of better than 4%, and shows that at temperatures above and below 25C mu is concentration- as well as temperature-dependent. (Author)

AD-619 024 Div. 4/3, 14/5, 14/6
CFSTI Prices: HC$1.00 MF$0.50

Redstone Scientific Information Center, Redstone Arsenal, Ala.
NEW ORGANIC SILICATES: (3-PHENOXY-PHENOXY) SILANES.
Jun 65, 16p Rept. no. RSIC-426
TT 65-62830

Unclassified report

Trans. of Patent (France) add. 81 295 to French Patent 1 317 630 by Monsanto Chemicals, Ltd., 14 Mar 62.

Descriptors: (*Heat resistant materials, Silanes), (*Silanes, Production), (*Coolants, Silanes), (*Hydraulic fluids, Silanes), (*Lubricants, Silanes), Ethers, Halides, Oxides, Patents, France.

The invention has as its object a production process for a thermostable, organic silane of formula (RO)nSiY-(4-n), where R is an aryloxyaryl group, Y is an aryl or thienyl radical, and n is an integer between 1 and 4. A silicon halogenide of formula SiXnY(4-n) (where X is a halogen atom) is brought to reaction with an aryloxyphenol of formula R. OH, in the presence of a basic oxide. The resultant organo-silane is one of the following: phenyltri-(3-phenoxyphenoxy) silane, diphenyldi(3-phenoxyphenoxy)silane, triphenyl(3-phenoxyphenoxy)silane, phenyltri(2-phenoxyphenoxy)silane, phenyl-2-thienyldi(3' -phenoxyphenoxy)silane, diphenyl-2-thienyl(3' - phenoxyphenoxy)silane, phenyl(2-diphenylyl)-di(3' -phenoxyphenoxy)silane, phenyl(4-diphenylyl)di(3' - phenoxyphenoxy)silane. The product constitutes a means for transmission of heat, a hydraulic fluid, or a lubricant. (Author)

AD-619 051 Div. 4/3, 14/3, 14/6
CFSTI Prices: HC$1.00 MF$0.50

Redstone Scientific Information Center, Redstone Arsenal, Ala.
IMPROVEMENT OF SILICO-ORGANIC COMPOUNDS (TRIPHENYLSILOXY-AND DIPHENYLCHLOROSILOXY BENZENES).
Jun 65, 18p Rept. no. RSIC-427
TT 65-62831

Unclassified report

Trans. of French patent 1 316 401, Patented by Monsanto Chemicals Ltd.

Descriptors: (*Heat-resistant materials, Silicon compounds), (*Silanes, Production), (*Siloxanes, Production), (*Coolants, Silicon compounds), (*Hydraulic fluids, Silicon compounds), Ethers, Halides, Stability, Patents, USSR.

The invention involves a class of thermally stable silico-organic substances and a process for their production. Specifically claimed are diphenyldi(3-triphenylsiloxyphenoxyl) silane and 1,3-di(3-triphenylsiloxyphenoxy diphenylsiloxy) benzene. The substances may be utilized as heat-exchanging media and as hydraulic fluids.

AD-619 099 Div. 4/4, 25/7
CFSTI Prices: HC$1.00 MF$0.50

Texas Univ., Austin. Dept. of Physics.
THE PHYSICS OF METASTABLE SYSTEMS.
Final rept. for 1 Feb 63-31 Jan 64,
by W. W. Robertson. 31 Jan 64, 7p
Grant AF AFOSR273 63
AFOSR 65-1047

Unclassified report

Descriptors: (*Atomic energy levels, Physics), (*Helium group gases, Atomic energy levels), Dissociation, Potential theory, Gas flow, Spectroscopy, Excitation, Glow discharges, Plasma medium, Cyclotron resonance phenomena, Microwave spectroscopy, Helium.

Research results in the following areas are briefly summarized: dissociation energy of He2(+) ($2\Sigma u(+)$); potential curve of the metastable helium molecule; a flow-system and burner for observing selective excitation of spectra by metastable species in the afterglow of a helium discharge; cyclotron resonance in slightly ionized gases. A list of publications generated under the contract, and which describe the research more fully, is included.

AD-619 100 Div. 4/4, 25/7
CFSTI Prices: HC$1.00 MF$0.50

Texas Univ., Austin. Dept. of Physics.
THE PHYSICS OF METASTABLE SYSTEMS.
Final rept. for 1 Feb 64-31 Jan 65,
by W. W. Robertson. 31 Jan 65, 13p
Grant AF AFOSR273 64

AFOSR 65-1052

Unclassified report

See also AD-619 099.

Descriptors: (*Atomic energy levels, Physics), (*Helium group gases, Atomic energy levels), Helium, Neon, Argon, Excitation, Glow discharges, Spectroscopy, Molecular spectroscopy, Electrophoresis.

Brief summaries are given of the results of research in the following areas: spectra excited in an argon afterglow; spectral emission of the helium afterglow; the helium afterglow (atomic spectrum, molecular spectrum); the molecular spectrum in a helium afterglow; atomic emission of the helium afterglow; spectra excited in a helium afterglow; cataphoresis in helium-neon mixtures. A cumulative list of publications generated under the contract, and which describe the research more fully, is included.

AD-619 115 Div. 4/2, 4/4

Clarkson Coll. of Tech., Potsdam, N. Y.
DETECTION OF METAL ION HYDROLYSIS BY COAGULATION. VI. BERYLLIUM.
Technical rept.,
by Egon Matijevic. 30 Sep 64, 9p
Rept. no. TR-5
Grant AROD31 124G320
AROD 2613:13

Unclassified report

Pub. in Journal of Colloid Science v20 n4 p322-9 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Beryllium, Hydrolysis), (*Hydrolysis, Determination), (*Coagulation, Beryllium), Metals, Ions, Colloids, Hydroxides, Beryllium compounds.

The hydrolysis of beryllium ion was investigated by means of the coagulation method. The charge of the hydrolyzed species is found to be +3. This finding is compared with the results of Sillen and collaborators and the differences are discussed. (Author)

AD-619 118 Div. 4/4, 4/3

Loyola Univ., Chicago, Ill.
RADIATIONLESS TRANSITIONS AND DEUTERIUM EFFECT ON FLUORESCENCE LIFETIMES OF SOME AROMATIC HYDROCARBONS,
by Joseph D. Laposa, E. C. Lim, and R. E. Kellogg.
11 Jan 65, 3p
AROD 2459:8

Unclassified report

Pub. in The Journal of Chemical Physics v42 n9 p3025-6 May 1 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Aromatic compounds, Fluorescence), (*Polycyclic compounds, Fluorescence), (*Fluorescence, Aromatic compounds), (*Electron transitions, Aromatic compounds), (*Deuterated compounds, Fluorescence), Atomic energy levels, Hydrocarbons, Excitation, Temperature.

The fluorescence lifetimes of several perprotonated and perdeuterated aromatic hydrocarbons were measured in rigid media at 77K. Within experimental error, no change is found in lifetime upon substitution of deuterium for protium. It is concluded from this result that radiationless first excited singlet to ground singlet transitions are unimportant in these systems. The fluorescence lifetime of anthracene at room temperature also compares favorably with that at low temperature, suggesting strongly that (first excited singlet to lowest triplet) radiationless processes in aromatics are temperature independent. (Author)

AD-619 136 Div. 4/4, 25/7, 4/2

University of Western Ontario, London. Dept. of Physics.
FRANCK-CONDON FACTORS FOR THE GAYDON-GREEN BAND SYSTEM OF N2,
by R. W. Nicholls. 8 Sep 64, 4p
Contract AF19 628 2820; Grant AF AFOSR62 236,
Proj. 9768, Task 976801
AFOSR 65-1086

Unclassified report

Pub. in Journal of Chemical Physics v42 n2 p804-5 Jan 15 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Nitrogen, Band spectrum), (*Molecular spectroscopy, Nitrogen), (*Band spectrum, Nitrogen), Molecular properties, Atomic orbitals, Intensity, Electron transitions, Potential theory, Functions, Canada.

A provisional array of Franck-Condon factors for the Gaydon-Green band system of N2 is presented. The data are given in tabulated form together with the wavelengths of the alpha-heads of the known bands. The Condon loci are traced by printing locally maximum Franck-Condon factors in bold-faced type. (Author)

AD-619 137 Div. 4/4, 25/7, 4/2

University of Western Ontario, London. Dept. of Physics.
FRANCK-CONDON FACTORS TO HIGH VIBRATIONAL QUANTUM NUMBERS IV: NO BAND SYSTEMS,
by R. W. Nicholls. 5 Jun 64, 8p
Contract AF19 628 2820; Grant AF AFOSR62 236,
Proj. 9765, Task 976501
AFOSR 65-1088

Unclassified report

Pub. in Journal of Research of the National Bureau of Standards. A. Physics and Chemistry v68A n5 p535-40 Sep-Oct 1964 (Copies not available to DDC or Clearinghouse customers)
See also AD-262 592.

Descriptors: (*Nitrogen compounds, Band spectrum), (*Molecular spectroscopy, Nitrogen compounds), (*Band spectrum, Nitrogen compounds), Atomic orbitals, Electron transitions, Intensity, Distribution, Potential theory, Functions, Molecular properties, Monoxides, Canada.

Franck-Condon factor arrays were computed numerically to highest known vibrational quantum numbers for the following NO band systems: beta: (B2Π-X2Π); gamma: (A2Σ(+)-X2Π); delta: (C2Π-X2Π); epsilon: (D2Σ(+)-X2Π); beta: (B'2 delta-X2Π); gamma: (E2Σ(+)-X2Π); Feast 1: (D2Σ(+)-A2Σ(+)); Feast 2: (E2Σ(+)-A2Σ(+)); Ogawa 1: (B'2 delta-B2Π); Ogawa 2: (b4Σ(+)-a4Π); 'M': (a4Π-X2Π). (Author)

AD-619 141 Div. 4/4, 25/7

Mellon Inst., Pittsburgh, Pa.
RELATIVE INTENSITIES OF LYMAN-BIRGE-HOPFIELD BANDS IN ELECTRON IMPACT SPECTRUM OF NITROGEN,

by Edwin N. Lassettre, Vincent D. Meyer, and Martin S. Longmire. 22 Sep 64, 4p
Grant AF AFOSR61-63
AFOSR 65-1102

Unclassified report

Pub. in The Journal of Chemical Physics. v42 n2 p807-9 Jan 15 1965.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Nitrogen, Band spectrum), (*Band spectrum, Intensity), Electron bombardment, Electron transitions, Selection rules, Probability, Potential theory, Functions, Dipole moments.

The transition X1Σg(+) to a1Πg in N2 was fully resolved and the relative intensities were determined.

AD-619 179 Div. 4/2, 10/5, 4/4
CFSTI Prices: HC$2.00 MF$0.50

Du Pont de Nemours (E. I.) and Co., Inc., Wilmington, Del. Electrochemicals Dept.
STABILITY OF HIGH STRENGTH H2O2.
Quarterly rept. no. 3, for period ending 30 Jun 65.
30 Jun 65, 39p
Contract AF04 611 10216, ARPA Order 24

Unclassified report

See also AD-615 036.

Descriptors: (*Oxidizers, Stability), (*Hydrogen peroxide, Stability), Decomposition, Storage, Containers, Paramagnetic resonance, Free radicals, Reaction kinetics, Absorption spectrum, Halocarbon plastics, Heat-resistant glass.

Studies of low temperature (-60C. to 0C.) storage of 90% and 98% hydrogen peroxide, both commercial (stabilized) and high purity (unstabilized) in passivated Pyrex glass were completed. Conclusions are the same as earlier reported. Work was devoted to improving the electron paramagnetic resonance equipment especially by the addition of a fast closing valve, thus damping out oscillations caused by stopping the flow, and allowing observation of events in the reaction of neutral solutions of TiCl3 and H2O2 in the 1-100 m sec. time range. This system is now an excellent tool to follow the radical growth and decay in peroxide reactions. To enable direct calculations of rate constants for these reactions, optical absorption studies on the products of the reaction have been begun. Irradiated 'Teflon' FEP fluorocarbon resin containers allow storage of such hydrogen peroxide with between one-half and one-third the decomposition encountered in carefully passivated aluminum or Pyrex glass.

AD-619 184 Div. 4/4, 4/2

Institute for the Study of Metals, Univ. of Chicago, Ill.
NUCLEAR MAGNETIC RESONANCE IN MOLTEN SALTS, II. CHEMICAL SHIFTS IN THALLIUM HALIDE-ALKALI HALIDE MIXTURES,
by Stefan Hafner and Norman H. Nachtrieb.
4 Aug 64, 9p
Contract SD89; Grant AF AFOSR624 64, Proj. 9710
Task 971002
AFOSR 65-0889

Unclassified report

Pub. in Journal of Chemical Physics v42 n2 p631-6 Jan 15 1965.
(Copies not available to DCC or Clearinghouse customers).

Descriptors: (*Thallium compounds, Nuclear magnetic resonance), (*Nuclear magnetic resonance, Thallium compounds), Salts, Liquids, Alkali metal compounds, Halides, Solutions, Ions, Chemical reactions.

The resonance frequency of the Tl205 nucleus in molten solutions of the thallous halides with the corresponding alkali metal halides varies linearly with the mole fraction of the added alkali halide. The direction of the chemical shift depends upon the radius of the alkali cation, being upfield for lithium and sodium halides and downfield for the halides of potassium, rubidium, and cesium relative to the pure thallous halide. For a given mole fraction of alkali halide, chemical shift is a linear function of the alkali cation radius. The results provide information on the nature of the interactions between cations and anions in molten salts. The covalent interaction between Tl(+) and halide ions is decreased by alkali metal ions of small radius and increased by those of large radius. (Author)

AD-619 229 Div. 4/4, 25/7

General Dynamics/Convair, San Diego, Calif.
ATOMIC-BEAM MEASUREMENTS OF VAN DER WAALS FORCES,
by Erhard W. Rothe and R. H. Neynaber.
11 Jan 65, 5p

Unclassified report

Pub. in The Journal of Chemical Physics v42 n9 p3306-9 1 May 1965.
(Copies not available to DDC or Clearinghouse customers).
Supported by ARPA (Proj. DEFENDER) through the Office of Naval Research.

Descriptors: (*Molecular beams, Scattering), (*Molecular association, Measurement), (*Atomic properties, Measurement), (*Pressure guages, Errors), Probability, Atomic energy levels, Helium, Neon, Alkali metals.

It is expected that the strength of the van der Waals potential may be calculated from measurements of the total scattering cross section Q if the collision is of sufficiently low energy. Unfortunately, experimental values obtained for C have been about a factor of 2 higher than those predicted by theory. This discrepancy would be resolved if experimental Q's were about 30% lower. This paper discusses a systematic experimental error which may account for the high values for Q. This error is the Ishii-Nakayama pumping effect, which occurs in the normal use of McLeod gauges. This error was eliminated in measurements of Q for scattering metastable helium and neon in rare gases. The resulting C's and corrected C's for previously published alkali scattering, no longer include the factor of 2 discrepancy. Comparisons are made with other experiments. (Author)

AD-619 237 Div. 4/3

Pittsburgh Univ., Pa.
PHOTOLYSIS OF TRIARYLPHOSPHINES,
by M. L. Kaufman and C. E. Griffin. 4 Jan 65, 5p
Grant AF AFOSR62 48
AFOSR 65-1129

Unclassified report

Pub. in Tetrahedron Letters n12 p769-72 1965
(Copies available only to DDC users).

Descriptors: (*Phosphines, Decomposition), (*Photochemistry, Phosphines), Ultraviolet radiation, Salts, Halides, Aromatic compounds, Organic solvents.

It was observed that ultra-violet radiation of triphenyl phosphine (I) or tris-p-tolyl phosphine (II) in phosphonium halide salts lead to the formation of tetraphenyl phosphonium halide and tetrakis-p-tolyl phosphonium halide, respectively. It is shown, by a study of I and II in simplier systems, that the two phosphines undergo a photoinitiated homolysis to produce arly radicals in a process independent of the photolysis of the phosphonium salts.

AD-619 239 Div. 4/3

Illinois Univ., Urbana.
ORGANOMETALLIC COMPOUNDS. III. SOME REACTIONS OF CHLORODIARYL, AND CHLORODIALKYL-TIN COMPLEXES.
Revised ed.,
by A. H. Westlake and D. F. Martin. 8 Feb 65, 12p
Contract DA31 124ARO D52
AROD 5200:3 Unclassified report

Pub. in Journal of Inorganic and Nuclear Chemistry v27 p1579-89 1965
(Copies available only to DDC users).
See also AD-611 963.

Descriptors: (*Metalorganic compounds, Tin compounds), (*Complex compounds, Tin compounds), (*Tin compounds, Metalorganic compounds), Synthesis-(Chemistry), Substitution reactions, Disproportionation. Valence, Chlorides.

Organotin-chelate compounds of the type R2Sn(Ox)Cl, where-Ox(-) is 8-quinolinolate, are formed from the interaction of R2SnCl2 and R2Sn(Ox)2. Chlorodiaryl- and chlorodialkyl-tin complexes undergo chloride substitution when treated with such reagents as lithium butyl, beta-diketones, iodide ion, ethoxide ion, and 8-quinolinol. Evidence is presented to show that some of these products have disproportionated. Evidence is also presented that some compounds, notably (C6H5)2 Sn(Ox)Cl, (CH3)2Sn(Ox)Cl and (CH3)2Sn(Ox)I, are examples of five-co-ordinate tin, while other compounds investigated, including a 'mixed chelate' compound (CH3)2Sn(Ox)(C6H5COCHCOC6H5), appear to be examples of six-co-ordinate tin. (Author)

AD-619 240 Div. 4/3, 4/4

Indiana Univ., Bloomington. Dept. of Chemistry.
AN ELECTRON DIFFRACTION INVESTIGATION OF THE PERI-BONDS IN PERYLENE,
by Marit Traetteberg. 3 Jul 64, 21p
Grant AF AFOSR602 64, Proj. 9760, Task 976002
AFOSR 65-1135 Unclassified report

Pub. in Proceedings of the Royal Society, A v283 p557-75 1965 (Copies available only to DDC users).

Descriptors: (*Polycyclic compounds, Molecular structure), (*Electron diffraction analysis, Polycyclic compounds), Chemical bonds, Vapors, Molecular isomerism, Atomic orbitals.

The molecular structure of perylene was studied in the vapour phase by the sector electron diffraction method. The average carbon-carbon bond distance in perylene apart from the peri-bonds was found to be about 0.010 A longer than the average carbon-carbon bond distance in the naphthalene molecule. The peri-bond length was determined to be 1.493±0.015 A. (Author)

AD-619 244 Div. 4/2
CFSTI Prices: HC$1.00 MF$0.50

Frankford Arsenal, Philadelphia.
DETERMINATION OF ZIRCONIUM IN ZIRCONIUM METAL AND ZIRCONIUM POWDER.
Test rept.,
by George Norwitz. Jul 65, 17p Rept. no. T65-9-1
Unclassified report

Descriptors: (*Zirconium, Volumetric analysis), Test methods, Chemical precipitation, Hafnium, Impurities, Powder metals, Determination, Solutions, Inorganic acids, Carboxylic acids, Aromatic compounds, Pyrolysis, Zirconium compounds, Dioxides.

An accurate method is proposed for the determination of zirconium in zirconium metal and zirconium powder. The sample is dissolved in a mixture of hydrofluoric, nitric, perchloric, and sulfuric acids, the solution is evaporated to dryness, the salts are dissolved in dilute hydrochloric acid, mandelic acid is added, the solution is heated at 80C. for 40 minutes, the zirconium mandelate is filtered off, the residual zirconium in the filtrate is recovered by heating at 80C. overnight, and the combined precipitates are ignited over a blast burner to zirconium dioxide. An investigation was made of the factors involved in the dissolution of the sample, precipitation with mandelic acid, ignition of the precipitate, and size of the sample. The effect of hafnium and possible interferences was considered. (Author)

AD-619 245 Div. 4/3, 14/8
CFSTI Prices: HC$1.00 MF$0.50

Culver Military Academy, Ind.
COORDINATION STUDIES WITH POLYMERIC SILYAMINES AND AMIDES.
Final rept.,
by Ronn N. Minne'. Aug 65, 15p
Contract Nonr371100
Unclassified report

Descriptors: (*Silicon compounds, Polymers), (*Amino plastics, Complex compounds), (*Polyamide plastics, Complex compounds), (*Aluminum compounds, Complex compounds), (*Beryllium compounds, Complex compounds), Synthesis(Chemistry), Silanes, Ethylenediamine, Chlorides, Adhesives, Stability, Chemical reactions, Valence.

It was found that the dimethylsilylamine polymer formed by reaction between dimethyldichlorosilane and ethylenediamine will react with anhydrous beryllium chloride to produce a coordination polymer which contains sufficient beryllium to coordinate up to 72% of the nitrogen atoms in the polymer, assuming that beryllium is four-coordinate. Reaction of the dimethylsilylamine polymer with aluminum chloride altered the physical properties of the polymer, but reaction with aluminum fluoride produced no change. The silylamine polymer formed by reaction between diphenyldichlorosilane and ethylenediamine has interesting adhesive properties and good resistance to hydrolysis. It shows only a slight tendency to react with beryllium chloride. A resinous polymeric amide was prepared by reaction between ethylene-diamine and fumaric acid. Coordination attempts with this polymer were unsuccessful, but coordination studies with polymers containing double bonds merit further attention. (Author)

AD-619 254 Div. 2/7, 4/4, 4/2
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., Philadelphia, Pa. Missile and Space Div.
THE ATMOSPHERIC CHEMICAL KINETICS OF N2O.
Scientific rept.,
by Marlyn H. Bortner. 29 Apr 65, 24p
Rept. nos. SR-2; 214-218S2
Contract AF19 628 4153, Proj. 7673

AFCRL 65-367

Unclassified report

Descriptors: (*Atmosphere, Reaction kinetics), (*Nitrogen compounds, Reaction kinetics), Oxides, Synthesis(Chemistry), Dissociation, Photochemistry, Ions, Electrons, Photons, Atomic energy levels.

The chemical kinetics of N2O are considered in detail. The mechanisms of formation and consumption of N2O and their total rates below 100 km were calculated as well as present knowledge of the parameters involved allows. N2O is formed by one or more of the reactions N2 + O(-) yields N2O + e, N2(A3Σ) + O2 yields N2O + O, and N2 + O N2O + photon. It is consummed by the photodissociation into N'2 + O and N + NO'. The rates of these reactions are slow enough to permit the mixing of N2O throughout this region of the atmosphere. (Author)

AD-619 266 Div. 4/4, 25/7
CFSTI Prices: HC$6.00 MF$1.25

Rocketdyne, Canoga Park, Calif.
RADIATIVE PROPERTIES OF GASES. VOLUME I. GENERAL DISCUSSIONS,
by R. V. Miller and S. A. Golden. 12 Aug 65, 218p
Rept. no. R-6272
Contract Nonr462300

Unclassified report

Descriptors: (*Absorption spectrum, Gases), (*Diatomic molecules, Electron transitions), (*Electron transitions, Absorption spectrum), Numerical analysis, Photons, Functions, Atomic energy levels, Potential theory, Nitrogen compounds, Oxides, Band spectrum.

The report describes theoretical studies of the basic radiative properties of high temperature gases. The primary emphasis of this work was devoted to methods of calculating spectral absorption coefficients of electronic transitions in diatomic molecules. The smeared line model was used to calculate absorption coefficients in fifty such transitions. Ancillary work included studies of methods of calculating numerical potential functions of the Rydberg-Klein-Rees type, solutions to the Schroedinger equation with such potential functions, and computational procedures for evaluating Franck-Condon and r-centroid factors. (Author)

AD-619 291 Div. 4/4, 25/7
CFSTI Prices: HC$4.00 MF$0.75

Ohio State Univ., Columbus. Dept. of Physics.
SYMPOSIUM ON MOLECULAR STRUCTURE AND SPECTROSCOPY, THE OHIO STATE UNIVERSITY, COLUMBUS, JUNE 14-18, 1965.
1965, 10p

Unclassified report

Symposium held in sponsorship with Graduate School, Ohio State Univ., National Science Foundation, Washington, D. C., and Office of Naval Research, Washington, D. C.

Descriptors: (*Molecular structure, Symposia), (*Molecular spectroscopy, Symposia).

The document is comprised of the program notes and abstracts of papers presented.

AD-619 297 Div. 4/1
CFSTI Prices: HC$1.00 MF$0.50

Lehigh Univ., Bethlehem, Pa.

MATHEMATICAL AND EXPERIMENTAL INVESTIGATION OF THERMAL INITIATION OF EXPLOSION.
Progress rept. for 1 Apr-1 Jul 65.
1 Jul 65, 3p
Contract DA28 017AMC1090A, Proj. 1C010501A007

Unclassified report

Descriptors: (*Explosions, Kinetic theory), Experimental data, Vacuum apparatus, Pyrolysis, Lead compounds, Azides, Explosive initiators.

AD-619 304 Div. 4/4, 4/1
CFSTI Prices: HC$5.00 MF$1.00

Illinois Univ., Urbana. Engineering Experiment Station.
INVESTIGATION OF WALL TURBULENCE USING A DIFFUSION-CONTROLLED ELECTRODE.
Scientific rept. no. 1, 1962-1965,
by James E. Mitchell and Thomas J. Hanratty.
Jul 65, 161p
Grant AF AFOSR547 65, Proj. 9781, Task 978102
AFOSR 65-1199

Unclassified report

Descriptors: (*Turbulence, Analysis), (*Shear stresses, Pipes), (*Electrodes, Diffusion), Transport properties, Electrochemistry, Anemometers, Fluid mechanics.

This study was performed to demonstrate that a diffusion-controlled electrode technique can be used to measure the average and fluctuating shear stresses at a pipe wall and to obtain a better understanding of the structure of turbulence near the wall. The technique was established after compensations for two effects, also common to the hot wire anemometer, were determined. The problem of non-uniform flow across the electrode was solved by determining experimentally a correction factor, whereas the problem of the time response of the electrode to fluctuations in the shear stress was handled by numerically solving the governing equations. The data for fully developed turbulence showed that the limiting velocity intensity at the wall was 0.32, based on the local average velocity, and that it was independent of Reynolds number. The circumferential scale was found to be very small near the wall but the longitudinal scale did not decrease from the values reported for the center of a pipe. Some velocity disturbances near the wall appeared to be as large as the local average velocity. A simplified model for a low frequency disturbance near the wall was investigated and found to be promising although several of the assumptions were not well substantiated. (Author)

AD-619 306 Div. 4/4, 4/3
CFSTI Prices: HC$1.00 MF$0.50

New York State Univ., Buffalo.
ACS DIVISION OF PHYSICAL CHEMISTRY 1965 SUMMER SYMPOSIUM ON RELAXATION TECHNIQUES IN CHEMICAL KINETICS IN SOLUTION, TO BE HELD AT STATE UNIVERSITY OF NEW YORK AT BUFFALO, JUNE 28-30, 1965.
Jun 65, 22p
AFOSR 65-1534

Unclassified report

Descriptors: (*Reaction kinetics, Symposia), (*Solutions, Reaction kinetics), Radiation chemistry, Nuclear magnetic resonance, Chemical bonds, pH, Molecular spectroscopy, Catalysis, Ions, Free radicals, Acids, Quinones, Azides, Hemoglobin, Deuterium.

Reports presented at the symposium are summarized: Microwave temperature-jump method; Pulse radiolytic

method; Application of n.m.r. to kinetic studies; Recent technique developments; Deuterium isotope effects in aqueous solutions of intramolecularly hydrogen-bonded acids from temperature-jump studies; Estimation of very fast reaction rates from the broadening of vibrational spectral lines; Systems of the quinone-hydroquinone type; the myoglobin-azide reaction; Cyctochrome-c systems; Prostatic acid phosphate catalysis studied by relaxation spectrometry; Kinetic studies of hydrogen bond reactions; Nuclear magnetic resonance measurements of water lifetimes in the first coordination sphere of metal ions; Ultrasonic investigation of step-wise ion association in solution; Kinetics of metal-liquid interactions as studied with the pressure step method; Reactions of the hydrated electron with metal complexes; Measurement of fast ionic reactions by relaxation effects of electron spin resonance; Pulse radiolysis studies of the hydroperoxy radical and ozonide ion in aqueous solution; Relaxation techniques for fast electrode processes; Primary hydration number of cations in solution from proton n.m.r. relaxation studies.

AD-619 321 Div. 4/4, 25/3, 9/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
SOME QUESTIONS OF THE KINETICS OF CHEMICAL REACTIONS IN PLASMA JETS,
by L. S. Polak and Yu. L. Khant. 29 Jul 65, 14p
Rept. no. FTD-TT-65-541
TT 65-62926
Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady, v156 n4 p920-3 1964.

Descriptors: (*Plasma jets, Chemical reactions), (*Chemical reactions, Plasma jets), (*Physical chemistry, Plasma jets), Dynamics, Theory, Hydrodynamics, USSR.

AD-619 322 Div. 4/3, 14/8
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
DETERMINING FLUORINE AND CHLORINE IN POLYMERS BY THE GAMMA-ACTIVATING METHOD,
by L. V. Chepel and F. V. Shemarov. 29 Jul 65, 9p
Rept. no. FTD-TT-65-539
TT 65-62927
Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady, v158 n3 p682-4 1964.

Descriptors: (*Polymers, Radioactivation analysis), (*Chlorine, Radioactivation analysis), (*Fluorine, Radioactivation analysis), (*Halocarbon plastics, Radioactivation analysis), (*Radioactivation analysis, Polymers), Gamma rays, Radioactive decay, USSR.

A method is given for the simultaneous determination of F and Cl in single halocarbon polymer samples by the selective activation of the halogens.

AD-619 331 Div. 4/2, 4/3
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
THERMAL STABILITY OF LITHIUM BOROHYDRIDE,
by E. M. Fedneva, V. I. Alpatova, and V. I. Mikheeva.
5 Aug 65, 8p Rept. no. FTD-TT-65-591
TT 65-62937 Unclassified report

Unedited rough draft trans. of Zhurnal Neorganicheskoi Khimii (USSR), v9 n6 p1519-20 1964.

Descriptors: (*Sodium compounds, Borohydrides), (*Borohydrides, Sodium compounds), Heat, Stability, Hydrogen, USSR.

Results are given of a study into the behavior of lithium borohydride and its dioxanate up to 600 degrees. Lithium borohydride on heating liberated about 80% of its whole amount of H; the residue was a light-brown mass that gave off H under the action of H2O. The dioxanate of the borohydride, LiBH4.C4H802, lost a molecule of dioxane at 85 degrees with simultaneous liberation of H. The liberation of H became more intense above 400 degrees.

AD-619 350 Div. 4/3, 14/8

Polytechnic Inst. of Brooklyn, N. Y. Inst. of Polymer Research.
PHOTOCHEMICAL REACTIONS IN PLASTICS.
Final rept. for 28 Feb 59-30 Sep 62,
by B. Broyde, J. Joussot-Dubien, M. Kryszewski, G. K. Oster, and G. Oster. Dec 62, 31p
Contract AF49 638 293
AFOSR 4376
Unclassified report

Consists of 4 reprints from 2 journals and 1 monograph (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Plastics, Photochemistry), (*Photochemistry, Plastics), (*Dyes, Photochemistry), Reduction(Chemistry), Phenolic plastics, Excitation, Vinyl plastics, Semiconductors, Ultraviolet radiation.

Contents:
Photoreduction of dyes in rigid media. I. Triphenylmethane dyes (J.Amer.Chem.Soc., 81, 1869(1959)).
Photoreduction of dyes in rigid media. II. Photoredox properties of thiazine dyes (J. Amer. Chem. Soc., 81, 5099 (1959)).
Interdependence of excited states of dichroic molecules. (Published in 'Luminescence of Organic and Inorganic Materials' (H. Kallmann and G. Spruch, Editors). John Wiley and Sons, Inc. 1962.)
Modifications of spectral and semiconducting properties of polyvinylidene chloride by ultraviolet light of specific wavelengths. (J. Polymer Science, 57, 937 (1962)).

AD-619 360 Div. 4/3

Minnesota Univ., Minneapolis. Dept. of Chemistry.
REACTION OF ENOL ETHERS WITH CARBENES. VI. ALLYLIC REARRANGEMENTS OF SULFUR YLIDS,
by William E. Parham and Siemen H. Groen.
24 Sep 64, 5p
Contract DA31 124AROD152
AROD 2819:7 Unclassified report

Research done in cooperation with Dept. of Organic Chemistry, Univ. of Groningen, Netherlands.
Pub. in Journal of Organic Chemistry v30 p728-32 Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Ethers, Chemical reactions), (*Organic sulfur compounds, Chemical reactions), Molecular isomerism, Sulfides, Chlorine compounds, Acetates, Halogenated hydrocarbons.

Evidence is presented for allylic rearrangements of sulfur ylids derived by reaction of ethyl trichloroacetate

and sodium methoxide with noncylic allyl sulfides. The reactions of alpha-, beta-, and gamma-methyallyl sulfides with ethyl trichloroacetate and sodium methoxide (dichlorocarbene) are discussed. (Author)

AD-619 364 Div. 4/3

Minnesota Univ., Minneapolis. School of Chemistry.
REACTION OF ENOL ETHERS WITH CARBENES. IV. ALLYL SULFIDES AND SATURATED SULFIDES,
by William E. Parham and Siemen H. Groen.
16 Dec 64, 7p
Contract DA31 124AROD152; Grant DA ORD31 124 61GB
AROD 2819:6

Unclassified report

Pub. in Journal of Organic Chemistry v29 p2214-20 Aug 1964 (Copies not available to DDC or Clearinghouse customers).
See also AD-619 360.

Descriptors: (*Ethers, Chemical reactions), (*Organic sulfur compounds, Chemical reactions), Sulfides, Acetates, Chlorine compounds, Addition reactions, Chlorination, Halogenated hydrocarbons.

The reaction of ethyl trichloroacetate and sodium methoxide with noncyclic allyl sulfides leads to the formation of 1-chloro 1-substituted mercaptobutadienes in high yields, together with some olefins derived by addition of hydrogen chloride to the butadienes. The course of these reactions is discussed, and additional data concerning reaction of saturated sulfides with ethyl trichloroacetate and sodium methoxide is presented. It is shown that saturated sulfides inhibit the formation of dichlorocyclopropyl adducts from olefins such as cyclohexene. Evidence is also presented for a minor chlorination process in reactions involving ethyl trichloroacetate and sodium methoxide. (Author)

AD-619 366 Div. 4/3

Massachusetts Inst. of Tech., Cambridge.
STUDIES IN PHOSPHINEMETHYLENE CHEMISTRY. X. THE REACTION OF ORGANOLITHIUM REAGENTS WITH ALKYLTRIPHENYLPHOSPHONIUM HALIDES. THE MECHANISM OF PHOSPHINEMETHYLENE FORMATION,
by Dietmar Seyferth, William B. Hughes, and James K. Heeren. 10 Mar 65, 8p
Grant DA AROD31 124G495
AROD 2832:22

Unclassified report

Pub. in Journal of the American Chemical Society v87 n13 p2847-54 Jul 5 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Organic phosphorus compounds, Chemical reactions), (*Lithium compounds, Metalorganic compounds), (*Phosphines, Chemical reactions), Deuterated compounds, Synthesis(Chemistry), Halides, Salts, Spectra(Infrared).

When organolithium reagents attack ((C6H5)3P(+)R)X(-) (R = ethyl or higher alkyl) it appears that simple proton abstraction by the organometallic base from the alkyl carbon atom adjacent to the phosphorus atom occurs. However, when R = methyl, ca. 25% of the organolithium reagent is consumed in a competing attack at the phosphorus atom. In the case of methyl-lithium, this attack at phosphorus was shown to lead to formation of (C6H5)2(CH3)P(+)C(-)H2. In the case of ethyllithium, this attack at phosphorus gave (C6H5)2-(C2H5)P(+)C(-)H2. Deuteration experiments showed that in the latter instance a mixture of this phosphinemethylene and of (C6H5)2(CH3)P(+)C(-)HCH3 was formed originally, but that subsequent transylidation reactions consumed the phosphineethylidene and formed the phosphine-methylene reagent. (Author)

AD-619 367 Div. 4/4, 9/1

Virginia Univ., Charlottesville.
EFFECT OF TURBULENCE ON RECOMBINATION LUMINESCENCE IN He II.
Revised ed.,
by Frank E. Moss, Frank L. Hereford, Forrest J. Agee, and James S. Vinson. 5 Apr 65, 3p
Grant DA AROD31 124G516
AROD 4685:2

Unclassified report

Pub. in Physical Review Letters v14 n20 p813-15 May 17 1965 (Copies not available to DDC or Clearinghouse customers). Revision of manuscript submitted 9 Dec 64.

Descriptors: (*Helium, Liquefied gases), (*Turbulence, Liquefied gases), (*Recombination reactions, Luminescence), Hysteresis, Cryogenics.

AD-619 368 Div. 4/3

New York Univ., N. Y.
PHOTOCHEMISTRY OF UNSATURATED KETONES. V. THE RADICAL FRAGMENTATION ROUTE ON PHOTOLYSIS OF 2,5-CYCLOHEXADIENONES. 4-METHYL-4-TRICHLOROMETHYL-2,5-CYCLOHEXADIENONE,
by David I. Schuster and Dinshaw J. Patel. 6 Apr 65, 3p
Grant DA ARO D31 124G425
AROD 4019:5

Unclassified report

Pub. in Journal of the American Chemical Society v87 n11 p2515-6 Jun 5 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Ketones, Photochemistry), (*Photochemistry, Ketones), (*Monocyclic compounds, Ketones), Ions, Free radicals, Chemical reactions.

Evidence is presented that, during the phototransformation of unsaturated ketones in solution, diradical intermediates (presumably in the excited state) precede the ionic intermediates, since in the case of appropriate dienones an alternate radical reaction path competes effectively with the ionic reactions.

AD-619 393 Div. 4/4, 25/7
CFSTI Prices: HC$1.00 MF$0.50

Air Force Materials Lab., Air Force Systems Command, Wright-Patterson AFB, Ohio.
EFFECT OF CHEMICAL COMBINATION ON THE SOFT X-RAY L EMISSION SPECTRA OF K, Cl AND S USING A STEARATE SOAP FILM CRYSTAL.
Technical summary rept. for Aug 64-Mar 65,
by David W. Fischer and William L. Baun. Jun 65, 25p Rept. no. ML-TR-65-139
Proj. 7367, Task 736702

Unclassified report

Descriptors: (*X-ray spectroscopy, Chemical bonds), (*Potassium, X-ray spectrum), (*Chlorine, X-ray spectrum), (*Sulfur, X-ray spectrum), (*Stearates, X-ray spectroscopy), Crystals, Films, Emissivity, Band spectrum.

Major changes, caused by chemical combination, were observed in the soft X-ray L emission spectra of potassium, chlorine and sulfur. For the simple chlorides the chlorine L2,3 band at about 68 A increases in wavelength as the ionic character of the chemical bond decreases. The sulfur L spectrum from elemental sulfur and the sulfides consists of a 3s and a 3d band and is in the 77 to 85 region. This spectrum changes considerably in the sulfates with the 3s band completely disappearing and the addition of a 3p band. The relative merits of the stearate soap film crystal for use in the 40 to 100 A region are also discussed. Results were obtained using a flat crystal vacuum spectrometer with electron beam excitation and flow proportional counter. (Author)

08. Earth Sciences and Oceanography

AD-618 766 Div. 2/6, 25/5, 2/1
CFSTI Prices: HC$1.00 MF$0.50

Palmer Physical Lab., Princeton Univ., N. J.
EXPERIMENTAL AND THEORETICAL INVESTIGATION OF GRAVITATION.
Status rept.,
by R. H. Dicke. 10 Jun 65, 15p
Contract Nonr185830, Proj. NR013 101

Unclassified report

Descriptors: (*Gravity, Relativity theory), (*Relativity theory, Gravity), Astrophysics, Geophysics, Radio astronomy, Sun, Earth, Solar eclipses, Galaxies, Radiometers, Blackbody radiation, Interstellar matter, Helium.

The principle research activities during the past year are discussed briefly: Solar oblateness, The earth's rotation, Solar eclipses, Pendulum, Helium formations, Stability and galaxy formation, 3 cm radiometer, Cosmology and infrared from distant galaxies.

AD-618 767 Div. 2/9, 2/5

Woods Hole Oceanographic Institution, Mass.
(No title).
Technical rept.,
by John M. Zeigler, Sherwood D. Tuttle, Graham S. Giese, Herman J. Tasha, and Robert Miller. Jul 65, 72p Reference 65-30-34
Contract Nonr219600, Proj. NR083 004

Unclassified report

(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Ocean waves, Velocity), (*Sedimentation, Oceanographic equipment), (*Venezuela, Hydrology), (*Marine geology, Massachusetts), (*Massachusetts, Marine geology), Sand, Foraminifera, Erosion, Water waves, Dynamics, Gulfs, Beaches, Computers, Instrumentation, Transport properties, Seacoast, Glaciers.

Collection of the following reprints:
DIRECT READOUT OF SEDIMENT ANALYSES BY SETTLING TUBE FOR COMPUTER PROCESSING, by John M. Zeigler, Carlyle R. Hayes, and Douglas C. Webb. Reference No. 65-30. Pub. in Science v145 n3627 p51 Jul 3 1964
THE HYDROGRAPHY AND SEDIMENTS OF THE GULF OF VENEZUELA, by John M. Zeigler. Reference No. 65-31. Pub. in Limnology and Oceanography v9 n3 p397-411 Jul 1964
RESIDENCE TIME OF SAND COMPOSING THE BEACHES AND BARS OF OUTER CAPE COD, by John M. Ziegler, Sherwood D. Tuttle, Graham S. Giese, and Herman J. Tasha. Reference No. 65-32. Pub. in Proceedings of the Conference on Coastal Engineering (9th) chap 26 p403-16 1964
THE INTERNAL VELOCITY FIELD IN BREAKING WAVES, by Robert L. Miller and John M. Zeigler. Reference No. 65-33. Pub. in Proceedings of the Conference on Coastal Engineering (9th) chap 7 p103-22 1964
PLEISTOCENE GEOLOGY OF OUTER CAPE COD, MASSACHUSETTS, by John M. Zeigler, Sherwood D. Tuttle, Herman J. Tasha, and Graham S. Giese. Reference No. 65-34. Pub. in Geological Society of America Bulletin v75 p705-14 Aug 1964.

AD-618 768 Div. 2/9

Woods Hole Oceanographic Institution, Mass.
SUBSURFACE CURRENTS OFF CAPE HATTERAS.
Technical rept.,
by Joseph R. Barrett, Jr. 25 Aug 64, 15p
Reference no. 65-36
Contract Nonr219600, Proj. NR083 004

Unclassified report

Pub. in Deep-Sea Research v12 p173-84 1965 (Copies available only to DDC users).

Descriptors: (*Ocean currents, Atlantic Ocean), Oceanographic data, Maps, Hydrographic surveying, Oceanology.

In October 1962, direct current measurements at depths of 800 m to 2500 m beneath the zone of swiftest surface currents near Cape Hatteras revealed a subsurface flow to the south. Analyses of temperature-salinity and dissolved oxygen distributions indicate that the immediate source of the southward flowing water was the region east of Cape Hatteras between the Gulf Stream and the Continental Slope. These measurements seem to affirm that continuity exists between the deep westward flow observed in the Slope Water Region by VOLKMANN and the southward flow east of Cape Romain, near 33 degree N, reported by SWALLOW and WORTHINGTON. The geostrophic volume transport of the southward flow was between 4 million and 12 million cu m/sec. The surface of zero axial velocity was at a depth of about 500 m at the left side of the region of swift surface current (inshore), and deepened rapidly in the offshore direction. (Author)

AD-618 771 Div. 2/5, 16/4

Wisconsin Univ., Madison. Dept. of Meteorology.
RADIOCARBON AND SOIL EVIDENCE OF FORMER FOREST IN THE SOUTHERN CANADIAN TUNDRA.
Technical rept.,
by Reid A. Bryson, William N. Irving, and James A. Larsen. 20 Nov 64, 7p Rept. no. TR-21
Contract Nonr120207, Proj. NR387 022

Unclassified report

Pub. in Science v147 n3653 p46-8 Jan 1 1965.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Paleontology, Trees), (*Geologic age determination, Trees), (*Trees, Paleontology), (*Ecology, Trees), Climatology, Plants(Botany), Forest fires, Canada, Soils, Charcoal, Geography.

Radiocarbon dating of charcoal on podzols along a transect reaching 280 kilometers north of the present tree line from Ennadai Lake indicates that former forests were burnt about 3500 years ago and again from 900 years ago. These forests probably were associated with periods of relatively mild climate. (Author)

AD-618 778 Div. 2/9

Lehigh Univ., Bethlehem, Pa. Marine Science Center.
CARBONATES: ASSOCIATION WITH ORGANIC MATTER IN SURFACE SEAWATER,
by Keith E. Chave. 8 Apr 65, 3p
Rept. no. MSC-65-3
Contract Nonr61007

Unclassified report

Pub. in Science v148 n3678 p1723-4 Jun 25 1965.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Sea water, Carbonates), (*Carbonates, Sea water), (*Minerals, Organic coatings), (*Organic substances, Sea water), X-ray diffraction analysis, Calcium compounds, Temperature, pH, Tropical regions.

Carbonate mineral particles suspended in surface seawater in tropical and subtropical areas do not interact measurably with the water. Identical complex mineral assemblages occur in waters in various states of saturation. Drastic alterations of temperature and pH in the laboratory do not affect the composition of the suspended carbonates. It appears that the mineral grains are protected from the water by resistant organic coatings. (Author)

AD-618 779 Div. 2/9

Miami Univ., Coral Gables, Fla. Inst. of Marine Science.
STUDIES ON TRACE ELEMENT DISTRIBUTION IN A SEDIMENT CORE FROM THE PACIFIC OCEAN,
by Sture Landergren and Oiva Joensuu. 1964, 11p
Contract Nonr400802; Grant NSF G21457
Unclassified report

Pub. in Progress in Oceanography v3 p179-89 1965 (Copies available only to DDC users).

Descriptors: (*Pacific Ocean, Ocean bottom sampling), (*Ocean bottom sampling, Chemicals), Distribution, Manganese compounds, Iron compounds, Clay, Carbonates, Phosphorus, Silicates, Oxides, Calcium compounds, Igneous rock, Colloids, Minerals, Marine biology, Rare earth elements, Alkaline earth metals, Alkali metals, Sedimentation.

Samples from a sediment core taken during the Swedish Deep-Sea Expedition 1947-48 were analyzed for their content of some minor constituents. The core, No. 69, Sta. 102, in the collection of the Expedition, was obtained from 13 degrees 25' S, 149 degrees 30' W. It was analyzed earlier for the major constituents, the ferrides and boron. The lower part of the core (565-340 cm from the top) is a manganiferous marl ooze, and the upper part (336-6 cm) is a manganiferous-ferruginous clay ('red clay). The decrease in the carbonate content during sedimentation is rather sudden at about the 340-cm level; the corresponding increase in the phosphorus concentration is more gradual. The average relative concentration of silicate-oxide (sil), phosphorus (ap) and CaCO3 (car) and the concentrations of the constituents studied are given. The excess and deficiency in the concentrations, in comparison with the averages, are discussed and also the probable sources of elements. Four chief sources are responsible for the distribution pattern of the miror constituents studied: the fine fractions of weathering material from basic igneous rocks, authigenic mineral forming processes in the sea, biological processes, and precipitation of metal ions on the surface of colloidal particles. (Author)

AD-618 780 Div. 2/10, 30/5

Seismological Lab., Calif Inst. of Tech., Pasadena.
SEISMIC DIGITAL DATA ACQUISITION SYSTEMS,
by Stewart W. Smith. 1964, 6p
Contract AF49 638 1337; Grant AF AFOSR62 421
Unclassified report

Pub. in Reviews of Geophysics v3 n1 p151-6 Feb 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Seismographs, Digital systems), Design, Broadband, Tests, Experimental data.

Two digital seismograph systems in current operation are described. Together they provide high quality data for experimental studies of earth tides, free oscillations, surface waves, and teleseismic body waves. A broad-band system sampling three components 10 times per sec covers the frequency range between 0.003 and 3.0 cps, and a long-period system sampling each of ten channels every 15 sec covers the range between 0.0 and 0.01 cps. The broad-band system can be used to simulate any desired standard seismograph and provides greater dynamic range and more flexibility than most existing seismographs. The long-period system is currently being used for a free oscillation experiment in which strain and pendulum seismographs record together. (Author)

AD-618 781 Div. 2/10

California Univ., Berkeley.
GRADIENTS OF TRAVEL-TIME CURVES FROM DEEP-FOCUS EARTHQUAKES,
by Bruce A. Bolt. 1965, 16p
Contract AF49 638 904; Grant NSF GP1922
Unclassified report

Pub. in Reviews of Geophysics v3 n1 p83-98 Feb 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Earthquakes, Seismic waves), (*Seismic waves, Earthquakes), Propagation, Time, Structural geology, Computers.

Inferences that can be drawn about the structure of the upper mantle from observations of surface-reflected longitudinal body phases are discussed. In particular, some aspects of previous observational, statistical, and theoretical work on the phase pP are reviewed. Recently, mathematical work has thrown more light on the properties of the cusps of the surface-reflected longitudinal phases. Seismological experiments are discussed that are designed to determine the actual behavior of the wave pulses near the cusps. Some preliminary attention has been given to this problem using a seismic array with linear dimension about 10 times greater than the observed wavelength. Computer analysis of the pulses observed at the array elements leads to estimates of the gradients of the travel-time curves. Weighting must be arranged to take into account the measured lateral refraction and crustal delays at each element. Analysis of the deep-focus earthquake of April 2, 1963, is presented as an example. (Author)

AD-618 782 Div. 2/10, 25/4

Acoustics and Seismics Lab., Univ. of Michigan, Ann Arbor.
DIRECTIONAL AND WIDE-BAND VELOCITY FILTERING,
by Philip L. Jackson. 18 Nov 64, 3p
Contracts AF49 638 1078, AF49 638 1170
Unclassified report

Pub. in Geophysics v30 n2 p279-80 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Seismic waves, Fourier analysis), (*Optical filters, Seismic waves), Velocity, Broadband, Diffraction, Geophysics.

It is pointed out that the condition of monochromatic illumination in obtaining a two-dimensional Fourier transform by optical means may be relaxed for wide-band velocity filtering, and for the directional filtering of any two-dimensional structure such as a contour map. Similar considerations hold for two-dimensional Fourier transforms obtained by any means.

AD-618 790 Div. 2/9, 2/10, 2/5

Scripps Institution of Oceanography, Univ. of California, La Jolla.

EFFECTS OF THE ALASKA EARTHQUAKE AND TSUNAMI ON RECENT DELTAIC SEDIMENTS,
by Erk Reimnitz and Neil F. Marshall. 21 Jun 65, 15p
Contract Nonr221623, Proj. NR083 005

Unclassified report

Pub. in Journal of Geophysical Research v70 n10 p2363-76 May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Earthquakes, Alaska), (*Ocean waves, Earthquakes), (*Marine geology, Earthquakes), Deltas, Silt, Sedimentation, Configuration, Seismology, Marine geophysics.

The Alaska Good Friday earthquake (its epicenter about 80 mi from the Copper River delta) and the events associated with the quake left indelible marks on the recent sediments of the delta. A relatively dense pattern of earthquake shock structures is found in the upper part of the section. These include sand dikes, sand pipes, slumps, faults, and joints. The structures increase in abundance toward the central part of the delta, where sediments are thickest, and become rare along its fringes, where sediments are thinnest. The 6-ft uplift of the region was responsible for some erosion and other immediate changes. But the establishment of a new equilibrium, biologically as well as geologically, for barrier islands, tidal flats, and marshes, will advance only gradually over the next few years. Seiches, brought about by the earthquake, with current velocities of up to 20 or 30 knots, regionally planed off the upper 2 or 3 ft of the tidal flats. These areas often are marked by accumulations of clam shells. The eroded materials were dumped into deep channels and troughs. (Author)

AD-618 791 Div. 2/9

Scripps Institution of Oceanography, Univ. of California, La Jolla.
MORPHOLOGY AND SEDIMENTS OF A PORTION OF THE MID-ATLANTIC RIDGE,
by Tjeerd H. van Andel, Vaughan T. Bowen, Peter L. Sachs, and Raymond Siever. 5 Mar 65, 5p
Contract Nonr221623, Proj. NR083 005

Unclassified report

Prepared in cooperation with Woods Hole Oceanographic Institution, Mass; Harvard Univ., Cambridge, Mass. Pub. in Science v148 n3674 p1214-6 May 28 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Atlantic Ocean, Ocean bottom topography), (*Oceanology, Atlantic Ocean), Ocean bottom sampling, Sedimentation, Marine geophysics, Marine geology.

In October 1964, a detailed geophysical and sampling survey was made of the central part of the Mid-Atlantic Ridge between 22 degrees and 23 degrees north latitude. The results indicate a large difference in age between the relief of the crest and that of the flanks of the Ridge and suggest that the crest portion is very young. Detailed surveys of two sediment-filled valleys on the upper western flank of the Ridge reveal different sedimentary sequences in the two valleys and indicate the probable existence of a locally controlled depositional regime and a significant local supply of sediment. (Author)

AD-618 792 Div. 2/9

Scripps Institution of Oceanography, Univ. of California, La Jolla.
INORGANIC NUTRIENT ANIONS IN DEEP OCEAN WATERS,
by Tsaihwa J. Chow and Arnold W. Mantyla.
15 Jul 65, 7p
Contract Nonr221623, Proj. NR083 005

Unclassified report

Pub. in Nature v206 n4982 p383-5 Apr 24 1965 (Copies available only to DDC users).

Descriptors: (*Oceans, Ions), (*Ecology, Oceans), Phosphates, Silicates, Nitrates, Inorganic compounds, Salts, Food, Pacific Ocean, Indian Ocean, Atlantic Ocean.

Data are presented on the phosphate, silicate, and nitrate content of the Indian, North Atlantic, and Pacific Ocean.

AD-618 876 Div. 2/9, 13/10
CFSTI Prices: HC$2.00 MF$0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
REFRACTION OF DISPERSIVE WAVES ON A BEACH.
Technical note,
by J. R. Evans and D. G. True. Jun 65, 27p
Rept. no. TN-N-738
Projs. Y F008 08 02 129, DASA14 083

Unclassified report

Descriptors: (*Beaches, Water waves), (*Water waves, Scattering), (*Structures, Vulnerability), Nuclear explosion damage, Underwater explosions, Snell's law, Mathematical prediction.

Refraction of dispersive type waves on a beach is predicted adequately by use of Snell's Law. Amplitudes of the refracted waves on a beach are predicted adequately by a modified form of Green's Law when the amplitude at one point '7' e.g., the toe of the beach, is known. (Author)

AD-618 881 Div. 2/9
CFSTI Prices: HC$3.00 MF$0.75

Naval Postgraduate School, Monterey, Calif.
A STUDY OF WATER CIRCULATION IN MONTEREY HARBOR USING RHODAMINE B DYE.
Master's thesis,
by John F. Breidenstein and David M. Thomas.
1965, 73p

Unclassified report

Descriptors: (*Harbors, Tidewater), (*Tidewater, Tracer studies), Ocean currents, Tides, Fluid dynamic properties, Markers, Dyes, Oceanology, California, Hydrographic surveying.

Rhodamine B dye was used to determine water circulation in Monterey Harbor. Point and line dye sources were traced visually, photographically, and by use of a fluorometer. The spreading of dye boundaries and the concentrations observed are presented in a time series of synoptic charts for each of the four surveys conducted. From these measurements, mean flow rates and a dye diffusion rate were determined. Circulation was found to be dominated by tidal currents, but wind-driven currents were important in the outer harbor. In the outer harbor, the circulation proved to be counterclockwise during rising tide, and clockwise during the falling tide. Flow was minimal in the inner harbor, or marina. Limited data indicate that the subsurface circulation agreed with the surface circulation in most of the surveys. (Author)

AD-618 884 Div. 2/9
CFSTI Prices: HC$3.00 MF$0.75

Naval Postgraduate School, Monterey, Calif.
BOTTOM CURRENT MEASUREMENTS IN THE HEAD OF MONTEREY SUBMARINE CANYON.
Master's thesis,
by Peter H. Gatje and Donald D. Pizinger.
1965, 68p
Unclassified report

Descriptors: (*Ocean currents, Ocean bottom), Oceanology, Seacoast, California, Bays, Ocean bottom topography, Tides, Hydrographic surveying.

Bottom current measurements were taken in the head of Monterey Submarine Canyon in a water depth of 130 meters (72 fathoms) utilizing an Ekman current meter placed 480 centimeters (15.7 feet) above the bottom. Currents were observed to follow the canyon axes, and flow was seaward (down-canyon) on the rising tide and coastward (up-canyon) on the falling tide. Current speed was sometimes fairly steady and other times variable. It ranged between 0 and 41 centimeters per second (0 to 0.8 knot) and had a median speed of 10 cm/sec (0.2 knot). The six hours centered around low tide generally had considerably stronger currents than the similar period of time centered around high tide. (Author)

AD-618 886 Div. 2/9
CFSTI Prices: HC$3.00 MF$0.75

Naval Postgraduate School, Monterey, Calif.
THE SEASONAL VARIATION OF PERMANENT CURRENTS WITHIN BAFFIN BAY.
Master's thesis,
by Robert L. Ceres. 1965, 54p
Unclassified report

Descriptors: (*Ocean currents, Artic regions), Oceanology, Atlantic Ocean, Periodic variations, Ice islands, Drift, Mathematical prediction, Climatology, Baffin Island.

The seasonal variation of permanent currents within Baffin Bay is investigated. A model based on physical reasoning is developed, whereby the speed of surface currents may be calculated during winter months, when observations are not available due to ice coverage. Verification is made where possible utilizing late fall, and early spring data. Limitations, applications, and variability of results are discussed. Two important applications are: first, to add to the oceanographic knowledge of the Baffin Bay area, and second, to provide an additional input to computer programs already in existence for forecasting the drift of sea ice within Baffin Bay. (Author)

AD-618 887 Div. 2/9
CFSTI Prices: HC$7.05 MF$2.25

Chesapeake Bay Inst., Johns Hopkins Univ., Annapolis, Md.
ATLAS OF THE DISTRIBUTION OF DISSOLVED OXYGEN AND pH IN CHESAPEAKE BAY 1949-1961.
Graphical summary rept.,
by R. I. Hires, E. D. Stroup, and R. C. Seitz.
Dec 63, 403p Rept. no. GSR-3, Reference 63-4
Contracts Nonr24820, PH86 62 79,
Proj. NR083 016
Unclassified report

Descriptors: (*Chesapeake Bay, Chemical properties), (*Oceanology, Chesapeake Bay), Graphics, Oceanographic data, Distribution, Oxygen, PH.

AD-618 898 Div. 2/8, 2/5
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
DIAMOND RESOURCES IN THE YAKUT REGION.
22 Jul 65, 6p Rept. no. FTD-TT-65-412
TT 65-62808
Unclassified report

Unedited rough draft trans. from Sovetskaya Rossiya (USSR) 30 Oct p4 1964.

Descriptors: (*Diamonds, USSR), Geography, Geophysics, Mining engineering.

AD-618 920 Div. 2/10
CFSTI Prices: HC$2.00 MF$0.50

Rhode Island Univ., Kingston.
RAYLEIGH WAVES AT THE CONTINENTAL MARGIN.
Scientific rept.,
by Julius Kane. 10 Jun 65, 36p Rept. no. SR-6
Contract AF19 628 319, ARPA Order nos. 180-62, 292-62, Task 865203
AFCRL 65-454
Unclassified report

Rept. on Proj. VELA-UNIFORM.

Descriptors: (*Seismic waves, Propagation), Mathematical models, Structural geology, Wave transmission, Field theory, Boundary value problems, Mechanical waves, Geophysics.

In this report, the first of a series on the analytic continuation of wave functions past discontinuities, the author introduces an elementary procedure for the solution of problems involving the diffraction of vector fields. In particular, the report discusses the propagation of Rayleigh waves incident obliquely upon the continental margin. The crustal layering on either side of the coastline is modeled mathematically as a two-part boundary layer in such a fashion that the relevant reflection and transmission coefficients emerge as elementary algebraic expressions. The procedure that permits such a solution to be found is to introduce a diffraction analogue of the well-known procedure in electrical engineering: replace a transmission line network by a lumped parameter equivalent in a specified frequency or wave number domain. (Author)

AD-618 928 Div. 2/9, 25/3, 30/3
CFSTI Prices: HC$1.00 MF$0.50

Navy Underwater Sound Lab., New London, Conn.
INSTRUMENTATION AND MEASUREMENT TECHNIQUES FOR THE DETECTION OF EXTREMELY LOW FREQUENCY ELECTROMAGNETIC ENERGY IN THE SEA.
Research rept.,
by James F. Orr. 28 Jun 65, 17p
Rept. no. USL-672
Proj. 1 400 01 00, Task SR004 03 01 0592
Unclassified report

Descriptors: (*Electromagnetic waves, Seas), (*Extremely low frequency, Electromagnetic waves), (*Seas, Electromagnetic properties), (*Oceans, Electromagnetic properties), Oceanographic equipment, Measuring devices(Electrical + Electronic), Marine geophysics, Underwater equipment, Oceanology.

The need for oceanographic data relating to electromagnetic noise in the Extremely Low Frequency region of the spectrum prompted the Laboratory to design instrumenta-

tion capable of obtaining absolute ELF measurements of sea-generated noise. The instrumentation as installed in the Navy General Oceanographic Research Vessel, USNS GILLISS (AGOR-4), is described, and the measurement techniques are discussed. Results of a power spectrum analysis on some of the data from the October 1964 trip of the GILLISS are presented. Ultimately the analysis of all the data will result in quantitative ELF electromagnetic noise levels as a function of frequency, time of day, season, geographic location, and meteorological and oceanographic conditions. (Author)

AD-618 932 Div. 2/9, 4/3
CFSTI Prices: HC$4.00 MF$0.75

Texas A and M Univ., College Station. Dept. of Oceanography and Meteorology.
A METHOD FOR THE DETERMINATION OF DISSOLVED ORGANIC CARBON IN SEA WATER BY GAS CHROMATOGRAPHY.
Technical rept.,
by Alan D. Fredericks and Donald W. Hood.
Jul 65, 107p Reference 65-18T
Contract Nonr211904, Proj. 286B
Unclassified report

Descriptors: (*Chromatographic analysis, Sea water), (*Sea water, Carbon compounds), (*Carbon compounds, Sea water), Organic compounds, Oxidation, Glass, Containers, Acids, Chemical analysis, Oceanology.

A procedure was developed for the determination of dissolved organic carbon in sea water in concentrations greater than 0.2 mg/l. Wet oxidation of the organic carbon was carried out in sealed glass ampoules with peroxydisulfuric acid. A filtered, five-milliliter sample was acidified and purged with purified oxygen to remove inorganic carbonate components. The glass ampoule was then sealed immediately with a specially fabricated oxy-acetylene microburner. The oxidation of organic matter was carried out at elevated temperature and pressure after collection of a large number of samples. The resulting carbon dioxide was flushed through a gas chromatograph with helium as the carrier gas and the signal was recorded on a strip chart recorder. Chromatographic analysis time was approximately eleven minutes per sample with a precision of ± 0.1 mg C/l. The organic carbon content of the sample was determined by measurement of the peak area using an appropriate carbon dioxide calibration curve. (Author)

AD-618 938 Div. 2/9

National Oceanographic Data Center, Washington, D. C.
INVENTORY OF BT DATA WORLD WIDE, ALL OCEANS AND SEASONS.
Catalog series.
Jan 64, 31p Publication NODC-C-2
Unclassified report

Available from U. S. Naval Oceanographic Data Center, Washington, D. C. 20390 HC$0.40.
Available from CFSTI MF$0.50.

Descriptors: (*Baththermograph data, Maps), (*Oceanology, Bathythermograph data), Marine meteorology, Atlantic Ocean, Pacific Ocean, Arctic Ocean.

This publication contains a compilation of annual and seasonal charts by oceans, showing the distribution (by 5 degree quadrangles of bathythermograph (BT) observations available in NODC.

AD-618 939 Div. 2/9, 23/3

National Oceanographic Data Center, Washington, D. C.
FILMS ON OCEANOGRAPHY.
Catalog series.
Dec 63, 30p Publication NODC-C-4
Unclassified report

Available from U. S. Naval Oceanographic Data Center, Washington, D. C. 20390 HC$0.25.
Available from CFSTI MF$0.50.

Descriptors: (*Oceanology, Training films), (*Training films, Oceanology), (*Motion pictures, Oceanology), Bibliographies, Training devices.

This brochure contains brief reviews of films dealing with some of the aspects of marine sciences. It has been prepared as a service to the public to guide those interested in the selection of suitable films. Frequent demands from teachers for material to introduce the science of oceanography to secondary and college level students have been a primary consideration in preparing these reviews. This listing is by no means exhaustive, although it contains most of the movies available to date. It will be updated as new films become available. There is a nominal charge for certain films.

AD-618 940 Div. 2/9, 32/3

National Oceanographic Data Center, Washington, D.C.
REFERENCE SOURCES FOR OCEANOGRAPHIC STATION DATA, VOLUME I.
Catalog series,
comp. by Carmen R. Johnson. 1965, 196p
Publication NODC-C-1, vol-1
Unclassified report

Available from U. S. Naval Oceanographic Data Center, Washington, D. C. 20390, HC$2.00.
Available from CFSTI MF$1.25.

Descriptors: (*Oceanographic data, Bibliographies), (*Documentation, Oceanology), Scientific research, Reports, Libraries, Catalogs, Information retrieval.

This publication is a catalog of reference sources from where oceanographic station data (source material) available at the National Oceanographic Data Center were obtained. Appendixes contain NODC Reference Cruise Number Index by Country and List of Final Processed Cruises as of 1 July 1964.

AD-618 941 Div. 2/9, 32/3

National Oceanographic Data Center, Washington, D. C.
REFERENCE SOURCES FOR OCEANOGRAPHIC STATION DATA, VOLUME II.
Catalog series,
comp. by Carmen R. Johnson. 1965, 144p
Publication NODC-C-1, vol-2
Unclassified report

Available from U. S. Naval Oceanographic Data Center, Washington, D. C. 20390, HC$2.00.
Available from CFSTI MF$1.00.
See also AD-618 940.

Descriptors: (*Oceanographic data, Bibliographies), (*Documentation, Oceanographic data), Scientific research, Reports, Libraries, Catalogs, Information retrieval.

This publication is a catalog of reference sources from where oceanographic station data (source material)

available at the National Oceanographic Data Center were obtained. Appendixes contain NODC Reference Cruise Number Index by Country and List of Final Processed Cruises as of 1 July 1964.

AD-618 943 Div. 2/9, 32/3

National Oceanographic Data Center, Washington, D. C.
INSTRUCTIONS FOR CODING AND KEYPUNCHING THE GEOLOGICAL INFORMATION FORM FOR CORE, GRAB, AND DREDGE SAMPLES.
Manual series.
1964, 43p Publication NODC-M-5(provisional)
Unclassified report

Available from U. S. National Oceanographic Data Center, Washington, D. C. 20390 HC$0.50.
Available from CFSTI MF$0.50.

Descriptors: (*Oceanographic data, Information retrieval), (*Information retrieval, Marine geology), (*Marine geology, Information retrieval), Ocean bottom sampling, Well logging, Reports, Libraries, Documentation, Punched cards.

In keeping with its charter, the National Oceanographic Data Center (NODC) has undertaken development of a storage and retrieval system for marine geological information. The system is being developed in two steps. The first provides the basic identification of cruise, station, instrument used, and the types of samples taken. The second will provide the actual data obtained through laboratory and other analyses. This manual provides instructions, codes, and conversion tables for completing the first step; i.e., for filling in the Geological Information Coding Form. It can be used also as an aid for interpreting the EAM cards and listings. This manual will be supplemented to include the instructions, codes, and conversion tables for step two when these data forms have been agreed upon by the responsible ad hoc committees and approved by the NODC Interagency Advisory Board.

AD-618 944 Div. 2/9, 32/3

Natioanl Oceanographic Data Center, Washington, D. C.
PROCESSING PHYSICAL AND CHEMICAL DATA FROM OCEANOGRAPHIC STATIONS. PART I. CODING AND KEYPUNCHING.
Manual series (Revised ed.)
1964, 120p
Publication NODC-M-2, pt-1
Unclassified report

Available from U. S. National Oceanographic Data Center, Washington, D. C. 20390 HC$1.00. Available from CFSTI MF$1.00.

Descriptors: (*Oceanographic data, Information retrieval), (*Information retrieval, Oceanographic data), Physical properties, Chemical properties, Marine meteorology, Libraries, Documentation, Punched cards, Oceanology.

The primary purpose of this manual is to provide the necessary instructions and conversion tables to code and keypunch reduced physical, chemical, and meteorological data collected at oceanographic stations in accordance with the storage-retrieval system developed by the National Oceanographic Data Center (NODC) in conjunction with the oceanographic community. The punch card format and codes described in this manual are based on the report of the Eastern Pacific Oceanic Conference (EPOC) Committee on Machine Processing for Oceanographic Data; the International Council for the Exploration of the Sea (ICES) oceanographic station card format; the Canadian Oceanographic Data Centre (CODC); and the card format originally used at the U. S. Naval Oceanographic Office (formerly the U. S. Navy Hydrographic Office). The secondary purpose of this manual is to acquaint the oceanographic community with the format of the processed oceanographic station data in the NODC archives.

AD-618 945 Div. 2/9, 32/3

National Oceanographic Data Center, Washington, D. C.
MANUAL FOR PROCESSING BATHYTHERMOGRAPH DATA. PART II. PROCEDURES FOR PROCESSING BATHYTHERMOGRAPH DATA IN ANALOG FORM.
Manual series.
1964, 33p Publication NODC-M-3, pt-2(provisional)
N65 15935
Unclassified report

Available from U. S. National Oceanographic Data Center, Washington, D. C. 20390 HC$0.50.
Available from CFSTI MF$0.50.

Descriptors: (*Bathythermograph data, Data processing systems), (*Information retrieval, Oceanographic data), (*Oceanographic data, Information retrieval), (*Data processing systems, Bathythermograph data), Documentation, Analog systems, Photographic techniques, Oceanology.

The BT analog processing can be divided into a number of successive steps reflecting the basic operational sequence: Acquisition, initial screening, pre-photography processing, photography, post-photography processing, monitoring, and archiving-distribution. The processing sequence has been formulated to achieve optimum standardization of procedure and optimum use of personnel. Some redundancy has been deliberately introduced, especially in respect to quality control. NODC receives BT's from many activities with widely differing field practices and from all ocean areas (and inland waters) of the world. Undoubtedly, area specialists processing their own data would find portions of this processing sequence superfluous. During processing at NODC, a number of auxiliary and often ephemeral records are generated. A detailed description of these have not been included in this provisional manual considering that they: (a) are for internal use only; (b) are subject to frequent change or modification; and (c) do not materially affect the processing sequence.

AD-618 946 Div. 2/9, 32/3

National Oceanographic Data Center, Washington, D. C.
INTRODUCTION TO THE NATIONAL OCEANOGRAPHIC DATA CENTER.
General series.
1963, 20p Publication NODC-G-1
Unclassified report

Available from U. S. Naval Oceanographic Data Center, Washington, D. C. 20390 HC$0.40.
Available from CFSTI MF$0.50.

Descriptors: (*Oceanographic data, Information retrieval), (*Information retrieval, Oceanographic data), (*Documentation, Oceanographic data), Oceanology, Libraries, Data processing systems.

The National Oceanographic Data Center is primarily a central repository for the Nation's oceanographic data. Part of its mission is: to receive, compile, process, and preserve oceanographic data for rapid retrieval; establish procedures for insuring that the accuracy and general quality of the incorporated data meet the criteria established by the Advisory Board, and prepare data summaries, tabulations, and atlases showing annual, seasonal, and monthly oceanographic conditions.

AD-618 947 Div. 2/9, 32/3

National Oceanographic Data Center, Washington, D. C.
INTERNATIONAL COOPERATIVE INVESTIGATIONS OF THE TROPICAL ATLANTIC, VOLUME I. DATA REPORT: EQUALENT I.
General series,
comp. by Albert M. Bargeski and Daniel Roberts, III.
1964, 290p Publication NODC-G-3, vol-1
Unclassified report

Available from U. S. Naval Oceanographic Data Center, Washington, D. C. 20390 HC$5.00.
Available from CFSTI MF$1.50.

Descriptors: (*Oceanographic data, Atlantic Ocean), (*Atlantic Ocean, Oceanographic data), Research program administration, Documentation, Marine meteorology, Marine biology, Oceanology, Tropical regions.

AD-618 948 Div. 2/9

National Oceanographic Data Center, Washington, D. C.
A SUMMARY OF TEMPERATURE-SALINITY CHARACTERISTICS OF THE PERSIAN GULF.
General Series,
by Harold W. Dubach. 1964, 226p
Publication NODC-G-4
N65 16068
Unclassified report

Available from National Oceanographic Data Center, Washington, D. C. 20390 HC$2.50.
Available from CFSTI MF$1.25.

Descriptors: (*Gulfs, Oceanographic data), (*Oceanographic data, Gulfs), Oceanology, Middle East, Temperature, Salinity, Graphics, Maps.

This report contains the data and analyses of all the known temperature and salinity observations made in the Persian Gulf. Charts previously published have been reproduced along with each author's comments on the temperature-salinity regime and its relationship to other environmental factors as determined by the particular set(s) of observations available for study at the time. An analysis of recent temperature-salinity observations (taken since 1950) has been prepared and is included; charts for each observation series are presented for the surface, 10-meter, 20-meter, and 30-meter levels. The position or location of observations are shown; the appendixes contain the observational data upon which the analyses are based. The distribution of bathythermograph data by 1 degree squares has been charted and included. Results of a 1961 survey (NODC Cruise 31865) were received and the processing completed just before going to press. These are included in order that this document might be as complete as possible; analyses for these data are not presented.

AD-618 949 Div. 2/9, 32/3

National Oceanographic Data Center, Washington, D. C.
INTERNATIONAL COOPERATIVE INVESTIGATIONS OF THE TROPICAL ATLANTIC, VOLUME II. DATA REPORT: EQUALANT I.
General series,
comp. by Albert M. Bargeski and Daniel Roberts, III.
1964, 795p Publication NODC-G-3, vol-2
Unclassified report

Available from U. S. National Oceanographic Data Center, Washington, D. C. 20390 HC$5.00
Available from CFSTI MF$3.25
See also AD-618 947.

Descriptors: (*Oceanographic data, Atlantic Ocean), (*Atlantic Ocean, Oceanographic data), Research program administration, Documentation, Oceanology, Tropical regions, Tables, Bathythermograph data.

This volume contains the oceanographic station data and associated digitized BT data collected during EQUALANT I which were machine processed by the National Oceanographic Data Center (NODC). These data were forwarded by the originators to the World Data Center A for Oceanography (WDC-A) in Washington, D. C., on coding forms especially prepared by NODC for the ICITA. The data were then processed by the NODC and copies of the processed machine listings were returned to the originators for corrections. Copies of these data were also sent to WDC-B (Oceanography) in Moscow in accordance with the original ICITA agreement. In order to have this Data Report published as expeditiously as possible, according to the wishes of the International Coordinator for ICITA, the 'ultimate' degree of quality control by either the originator or NODC was not possible. Residual errors may well remain. If a sufficient number of errors is discovered and the NODC is notified, an errata will be issued to supplement this report.

AD-618 950 Div. 2/9, 32/3

National Oceanographic Data Center, Washington, D. C.
INTERNATIONAL COOPERATIVE INVESTIGATIONS OF THE TROPICAL ATLANTIC. DATA REPORT: EQUALANT II.
General series,
comp. by Albert M. Bargeski and John R. Frank.
1964, 758p Publication NODC-G-5
N65 16069
Unclassified report

Available from U. S. National Oceanographic Data Center, Washington, D. C. 20390 HC$5.00. Available from CFSTI MF$3.25.

Descriptors: (*Oceanographic data, Atlantic Ocean), (*Atlantic Ocean, Oceanographic data), Research program administration, United Nations, Documentation, Oceanology, Marine meteorology, Marine biology, Oceanographic vessels.

EQUALANT II, the second cooperative oceanographic campaign forming part of the International Cooperative Investigations of the Tropical Atlantic coordinated by the Intergovernmental Oceanographic Commission of UNESCO, was carried out in August - September 1963. Eleven vessels from eight nations (Argentina, Brazil, Republic of the Congo (Brazzaville), Nigeria, Republic of the Ivory Coast, Spain, USA and USSR) took part in EQUALANT II. Scientists from the Federal Republic of Germany, England and Venezuela joined some of the above vessels in order to participate in the Expedition. Oceanographic data presented in this report include: Description of participating ships and their programs, oceanographic station data, meteorological data, and biological data.

AD-618 962 Div. 2/2, 2/4, 12/1

Air Force Cambridge Research Labs.,
Bedford, Mass.
ANNA SATELLITE YIELDS PHOTOGRAMMETRIC PARAMETERS.
Instrumentation papers,
by Owen W. Williams. 1965, 13p
Rept. nos. AFCRL-65-379, IP-63
Proj. 7600
Unclassified report

Presented at the Congress (10th), International Society of Photogrammetry, Lisbon, Portugal, Sep 1964. Pub. in Photogrammetric Engineering p340-7 Mar 65 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Geodesics, Scientific satellites), (*Scientific satellites, Geodesics), (*Photogrammetry, Geodesics), Stroboscopes, Light, Intensity, Optical images.

One of the major considerations associated with Satellite Geodesy using photogrammetric techniques is the critical design of a minimum-weight, minimum-power strobe light which produces a photographable intensity consistent with camera systems used in the optical program. The relationship between flash intensity and range (or image diameter) has been approximated, but the theoretical formulae need to be validated and improved. This paper presents an evaluation of these computations as derived from actual photographic plates taken during the ANNA Geodetic Satellite Program. The light-intensity and light-pattern measurements performed on the ANNA light prior to launch and the known ranges and position of the satellite available from the orbit analysis will serve as constraints to investigate other photographic parameters. The relationship between flash intensity, range, and exposure versus image diameter curves will be presented and the results extrapolated to other geodetic satellite programs. (Author)

AD-618 979 Div. 2/10, 15/1

Lincoln Lab., Mass. Inst. of Tech., Lexington.
LEAST-SQUARES ARRAY PROCESSING FOR SIGNALS OF UNKNOWN FORM.
Revised ed.,
by Morris J. Levin. 1 Feb 65, 10p
Paper no. P-972
Contract AF19 628 500
ESD TDR-65-248

Unclassified report

Symposium on Signal Processing in Radar and Sonar Directional Systems: Paper no. 17, held in Birmingham, 6-9 Jul 64. Pub. in Radio and Electronic Engineer v29 n4 p213-22 (Copies available only to DDC users). Revision of manuscript submitted 2 Apr 64.

Descriptors: (*Seismic waves, Processing), (*Least squares method, Seismic waves), Velocity, Angle of arrival, Wave analyzers, Mathematical models.

Statistical methods are applied to the estimation of the velocity, arrival-angle and waveform of a signal appearing in any array of sensors in the presence of random noise. The signal is assumed to be a plane wave propagating through a linear, homogeneous, non-dispersive medium so that it is the same in each sensor except for a time delay due to its finite velocity. The method is appropriate for applications such as seismology and passive sonar in which the signal waveform is unknown, yet cannot be realistically represented as a stationary random process (as is required, for example, by Wiener filtering theory). A least-squares procedure is described which does not depend on any assumptions regarding the noise. This simple criterion is found to imply time-shift and sum processing which is related to other techniques previously employed. For known noise statistics the mean-square response of the processor to the noise is calculated and the covariance matrix of the estimates is approximated for the high signal-to-noise ratio case. The resulting array pattern is evaluated in terms of the signal spectrum and the array geometry. The results are compared with a more elaborate maximum-likelihood approach based on stationary Gaussian noise with a known spectral density matrix. (Author)

AD-619 014 Div. 2/9, 14/8, 14/4, 14/9, 14/10, 31/3, 30/5
CFSTI Prices: HC$3.00 MF$0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
DEEP-OCEAN BIODETERIORATION OF MATERIALS. PART II. SIX MONTHS AT 2,340 FEET.
Technical rept.,
by James S. Muraoka. Aug 65, 48p
Rept. no. TR-R-393
Proj. Y R011 01 01 042

Unclassified report

See also AD-608 939.

Descriptors: (*Materials, Fungus deterioration), (*Marine biology, Fouling), Liquid immersion tests, Sea water, Oceanographic data, Marine borers, Degradation, Plastics, Aluminum, Cordage, Polyethylene plastics, Nickel, Metals, Wood, Fibers(Natural), Glass, Rubber, Butyl rubber, Sedimentation, Microorganisms.

This is Part II of a series of reports on the biological deterioration of materials in the deep ocean. It covers the data obtained after exposing 2,385 specimens of 603 different materials for 6 months (197 days) on the Pacific Ocean floor at a depth of 2,340 feet (Test Site II). The materials were attached to a Submersible Test Unit (STU). The STU was retrieved in December 1964 and returned to the Laboratory for test and analysis. There were marine fouling organisms attached to the plastic ropes, aluminum buoys, polyethylene-jacketed wire rope, nickel-plated shackles, and on some metal test specimens. Most of the plastic and all of the rope materials were covered with bacterial slime growth. Wood panels, plastics, and Manila rope were attacked by marine borers. Cotton and Manila rope specimens and jute-fiber burlap wrappings were severely deteriorated by bacterial action. Metal, glass, natural and butyl rubber, and some plastics with a smooth and extra hard surface were not affected. The biological effects on materials recovered from Test Site II are briefly compared with materials recovered from Test Site I. (Author)

AD-619 020 Div. 2/10, 15/2
CFSTI Prices: HC$2.00 MF$0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
AN APPROACH TO ESTIMATION IN SEISMIC EQUALIZATION.
Technical note,
by R. Price. 28 Jun 65, 31p
Rept. no. TN-1965-24
Contract AF19 628 500, ARPA Order 512
ESD TDR-65-272

Unclassified report

Descriptors: (*Seismic waves, Wave analyzers), (*Correlation techniques, Seismic waves), Detection, Statistical analysis, Interference, Transducers, Functions.

The 'seismic equalization' problem is that of correcting the response at one station to match that at another station which may have different instrument characteristics and different (and unknown) local reverberation characteristics. The problem of seismic equalization is formulated mathematically, and that portion involving measurement or estimation of a transfer-function ratio is modeled and attacked on statistical terms, first by an ad hoc procedure and then by the method of maximum likelihood. (Author)

AD-619 026 Div. 2/9
CFSTI Prices: HC$1.00 MF$0.50

Naval Ordnance Lab., White Oak, Md.

A METHOD OF AIRBORNE BOTTOM-REFLECTIVITY SURVEYING,
by R. J. Urick, C. E. Kelly, and M. H. Stripling.
Aug 65, 25p Rept. no. NOLTR-65-90
Proj. NOL732SP
Unclassified report

Prepared for presentation at the Symposium on Military Oceanography (2nd), Washington, D. C., May 65.

Descriptors: (*Ocean bottom, Surveying), (*Underwater sound, Measurement), (*Acoustic equipment, Airborne), Feasibility studies, Oceanographic data, Echo ranging, Radio sono buoys.

The acoustic reflectivity of the ocean bottom has been measured by means of sonobuoys and standard Navy explosive sound signals dropped from an aircraft. Charges were dropped at distances up to 10 miles from a modified AN/SSQ-23 sonobuoy to give data at various grazing angles. Drops were made at 85 widely spaced locations in the Atlantic westward from Bermuda on 5 aircraft operating days, including drops for comparison purposes in OPEVAL Areas A, B and C, where bottom reflectivity had previously been measured by the Oceanographic Office. The tape recordings made aboard the aircraft were later filtered, squared, and integrated to give the energy reflection coefficients of the bottom. The method appears to have merit as a means of rapid, mobile and inexpensive acoustic surveying. (Author)

AD-619 106 Div, 2/9, 30/3

GM Defense Research Labs., Santa Barbara, Calif.
ICE DRILLING IN FLETCHER'S ICE ISLAND (T-3) WITH A PORTABLE MECHANICAL DRILL.
Final rept.,
by Beaumont M. Buck. 1965, 7p
Rept. no. TR65-52
Contracts Nonr374400, Nonr432200
Unclassified report

Pub. in Arctic v18 1 p52-4 Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Ice islands, Drills), (*Drills, Ice), Hydrophones, Oceanographic equipment, Thermistors, Seismology, Portable, Test equipment.

An experiment was conducted on Ice Island T-3 during the spring of 1964 to test portable techniques for installing oceanographic instruments through the 100-foot-thick ice. A small mechanical drill which uses compressed air as the flushing medium was used successfully to drill 8 holes, each 3 inches in diameter. Hydrophones, seismometers and a thermistor chain were implanted below and in the ice of the island using these holes. The drill attained a rate of about 2 ft/minute. A 'slush plug' of soft ice developed in each hole upon breaking through the island bottom. This plug made it difficult to lower instruments of large cross section. (Author)

AD-619 232 Div. 2/9, 2/3, 2/5

Washington Univ., Seattle. Dept. of Atmospheric Sciences.
STUDIES OF THE MASS BUDGET OF ARCTIC PACK-ICE FLOES.
Technical rept.,
by Arnold M. Hanson. 23 Jun 64, 10p
Rept. no. TR-14
Contract NONR47724, Proj. NR307 252
Unclassified report

Pub. in Journal of Glaciology v5 n41 p701-9 Jun 1965 (Copies available only to DDC users).

Descriptors: (*Ice islands, Phase studies), Glaciers, Ice, Chukchi Sea, Artic regions, Climatology, Meteorology, Oceanology.

The processes of melting, freezing, precipitation, evaporation and condensation were considered in the computation of the mass budget of an ice floe in the northern Chukchi Sea. It was found that condensation and evaporation contribute negligible amounts, and that melting accounted for the largest loss from the upper surface of the floe. From an original mass of 270 g./sq cm, a unit ice column lost 9.2 g./sq cm by melting of snow and 35.2 g./sq cm by melting of ice during the melt season. During the freezing period 5.8 g./sq cm were regained by the accumulation of snow and frost. Measurements at the bottom of the ice indicate an estimated net loss of 5 g./sq cm over a seven-month study. A comparison of six summers at three stations shows no obvious correlation of ablation and latitude, and an average loss of ice at the surface of 40 g./sq cm. (Author)

AD-619 257 Div. 2/9, 16/4, 31/5
CFSTI Prices: HC$7.00 MF$2.00

Naval Oceanographic Office, Washington, D. C.
MARINE FOULING AND BORERS,
ed. by I. V. Starostin. 1965, 402p Translation-221
TT 65-62932
Unclassified report

Trans. of Akademiya Nauk SSSR. Institut Okeanologii. Trudy, v70 279p 1963.
Morskiye Obrastaniya i Drevotochtsy.

Descriptors: (*Marine borers, Fouling), (*Marine biology, Fouling), Algae, Aquatic animals, Mollusca, Larvae, Bacteria, Corrosion, Sea water, Water supplies, Ecology, Baltic Sea, White Sea, Black Sea, Southeast Asia, Oceanology, USSR.

Contents: Marine fouling in the Caspian Sea; Mass development of the Polychaete Mercierella enigmatica Fauvel in Krasnovodskiy zaliv; Data on the Flora of Diatom Algae in marine fouling along the East Coast of the Caspian Sea; Marine fouling in the Southeastern Part of the Baltic Sea; Marine fouling in the White Sea; Cirripedians in the fouling of the Black Sea; Cirripedian Fauna (Cirripedia thoracica) along the Continental Coast of Southeast Asia; Marine fouling in technical water conduits; Species composition and quantitative development of macrofouling in the sea water supply system of a metallurgical factory on the Sea of Azov; Settlement on water intake structures of a metallurgical plant by the larvae of fouling organisms (Sea of Azov); Settlement by larvae of fouling organisms and by marine borers (Teredinidae) in the Gelendzhik and Novorossiysk area; Beginning of colonization of the Sea of Azov by several species of marine borers of the family Teredinidae; Settlements of larvae of the marine borer Teredo navalis L. (Mollusca, Teredinidae) and the temperature of water in Gelendzhikskaya bukhta of the Black Sea; Influence of water having various salinities on the physiological processes of the Black Sea Bivalve Mollusk Teredo pedicellata Quatrefages.

AD-619 261 Div. 2/6, 2/10, 2/5
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
ACTA GEOPHYSICA SINICA, VOL. 13 NO. 1, 1964: TABLE OF CONTENTS AND ABSTRACTS.
Apr 65, 10p

Rept. no. E-TC-Ch-65-31
Contract AF19 628 5073
TT 65-62898

Unclassified report

Abstract trans. of Ti Ch'iu Wu Li Hsueh Pao (Chinese People's Republic) v13 n1 p1-90 1964.

Descriptors: (*Geophysics, China), Magnetohydrodynamics, Shock waves, Terrestrial magnetism, Solar flares, Sunspots, Magnetometers, Seismology, Structural geology, Geophysical prospecting, Scientific research, Abstracting.

Contents: Propagation of hydromagnetic shock waves in an inhomogeneous magnetic field; the geomagnetic effects of major flares in the sunspot regions of magnetic classes gamma and beta gamma; a note on the non-uniqueness of the Umkehr method B; on increasing the accuracy of a visual magnetometer; a study of the P and S waves at 5 - 30 degrees and of the structure of the earth's mantle; the transmitting sources in two-dimensional seismic model experiments; some problems concerning the design of the 581 microseismograph; theory of grouping of pulsating waves; and several problems concerning ore prospecting using the direct-current method.

AD-619 293 Div. 2/6, 30/5
CFSTI Prices: HC$2.00 MF$0.50

Danish Meteorological Inst., Charlottenlund.
DETERMINATION OF CONSTANTS OF A SPECIAL MAGNETOGRAPH RUN AT GODHAVN GEOPHYSICAL OBSERVATORY FOR DR. E. J. CHERNOSKY, AFCRL.
Scientific rept. no. 1, 1 Jan 60-31 Dec 63,
by Knud Lassen. 26 Feb 65, 29p Rept. no. SR-1
Contract AF61 052 507
AFCRL 65-510

Unclassified report

Descriptors: (*Terrestrial magnetism, Denmark), (*Magnetometers, Photographic recording systems), (*Photographic recording systems, Magnetometers), Geophysics, Measuring devices(Electrical + Electronic), Atmospheric temperature, Periodic variations, Correlation techniques, Graphics, Tables.

This report concerns the determination of formula and baseline values for the period January 1, 1960 to December 31, 1963 for the H-magnetograph run at Godhavn Geophysical Observatory for Dr. E. J. Chernosky on a contract with AFCRL. Besides bringing the formula and constants necessary for a further study of the magnetograms the report shows the existence of a regular yearly variation of the baseline values nearly in phase with the variation of the air temperature at Godhavn. Since the magnetograph is kept at a constant temperature in a well insulated shelter it is assumed that the dependence on the variation of the outdoor temperature is an indirect one, probably a dependence on the variation of the humidity in the shelter. (Author)

AD-619 359 Div. 2/5, 30/5

Princeton Univ., N. J.
DATA ANALYSIS AND THE FRONTIERS OF GEOPHYSICS,
by John W. Tukey. 1963, 8p
Contract DA31 124ARO D215
AROD 1715:65

Unclassified report

Pub. in Science, v148 n3675 p1283-9 Jun 4 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Geophysics, Data processing systems), (*Data processing systems, Geophysics), Instrumentation, Spectroscopy, Numerical methods and procedures, Reviews.

This paper presents three areas in which it is thought newer techniques of data analysis will come into, or be developed in, geophysics which will advance the knowledge about the plasma-like, gaseous, liquid, and solid earth: (1) developments along the line of the concepts of the spectrum, with emphasis both on the use of cross-spectral methods of studying relationship and on bispectrum and higher methods of studying nonlinearities (including modulations) and frequency interations; (2) wise choice of modes of expression for analysis; (3) the use of methods appropriate and effective in situations where distributions of errors and fluctuations do not have exactly the magic bell-shaped distribution.

AD-619 388 Div. 2/10, 2/5
CFSTI Prices: HC$4.00 MF$0.75

Uppsala Univ. (Sweden).
RHEOLOGIC PROPERTIES OF THE SOLID EARTH.
Final rept. for 1 May 62-31 Mar 65,
by Markus Bath and Seweryn J. Duda. 24 Jun 65, 118p
Contract AF61 052 588, Proj. 8652; ARPA Order 180-62, Task 86520
AFCRL 65-565

Unclassified report

Descriptors: (*Seismology, Earthquakes), (*Lithosphere, Mechanical properties), (*Earthquakes, Intensity), Geophysics, Energy, Strain(Mechanics), Stresses, Geology.

The paper is based on data for the largest earthquakes (magnitude 7 or above) in the interval 1897-1964. Strain energy release and numbers of earthquakes are studied both in relation to their time and space distribution. The circum-Pacific belt exhibits two pronounced concentrations of strain energy release, in its NW and SE part. There is a general decrease of seismic activity over the period investigated. The whole material used is presented in a table, probably the most complete list of large earthquakes so far published. (Author)

AD-619 398 Div. 2/5, 25/6
CFSTI Prices: HC$6.00 MF$1.25

Princeton Univ., N. J. School of Engineering and Applied Science.
SHEAR PHENOMENA IN GRANULAR RANDOM PACKINGS.
Scientific rept. no. 2,
by Thomas F. Herbst and Hans F. Winterkorn.
30 May 65, 221p Soil engineering research series no. SERS-2
Contract AF19 628 2414, Proj. 7628, Task 762804
AFCRL 65-370

Unclassified report

See also AD-436 458.

Descriptors: (*Soils, Shear stresses), (*Shear stresses, Soil mechanics), Mechanical properties, Sand, Gravel, Solids, Liquids, Solutions, Internal friction, Thermodynamics, Deformation, Statistical analysis, Test methods.

The results are presented of a research project on the mechanical resistance properties and behavior in deformation of macro-particle systems in the light of the theory of the macro-meritic solid, liquid and solution states. A critical analysis and appraisal is made of what goes on in the shear process as a result of design and working features of the test apparatus, as well as of intrinsic properties of the granular system that is under test. The results of this analysis are utilized for the design of a semiautomatic direct shear tester. The historical development of our understanding of the shear process in molecular and macro-meritic systems is traced and an indication is given of how thermodynamic and kinetic-statistical concepts can be fruitfully employed in this continued quest.

09. Electronics and Electrical Engineering

AD-618 694 Div. 8/4, 8/3
CFSTI Prices: HC$2.00 MF$0.50

Electron Physics Lab., Univ. of Michigan, Ann Arbor.
HYDRODYNAMIC ANALYSIS OF NOISE IN A FINITE TEMPERATURE ELECTRON BEAM.
Interim rept.,
by H. C. Hsieh. Jun 65, 39p
Rept. no. TR-83
Contract AF30 602 3569, Projs. 5573, 06847, Task 557303
RADC TR-65-110

Unclassified report

Descriptors: (*Electron beams, Hydrodynamics), (*Noise(Radio), Electron beams), Temperature, Velocity, Thermal conductivity, Electric currents, Diodes-(Electron tubes), Differential equations, Potential theory.

On the basis of a small-signal, one-dimensional analysis, a set of basic macroscopic differential equations, governing the fluctuations in quantities such as the electron-beam temperature, the mean velocity and the current density, was derived by taking moments of the Liouville equation with respect to the velocity variable. This set of differential equations expresses the conservations of charge, momentum and energy, and is valid for an arbitrary amount of velocity spreading and includes the effect of heat conduction. A system of differential equations, governing the correlation among the fluctuations in the mean velocity, current density and beam temperature, is also derived. The relationship among the various noise parameters along the electron beam is obtained in the form of a system of differential equations whose solution gives detailed information on the variation of the noisiness parameter along the beam. The solution of the system of differential equations thus derived is also discussed. (Author)

AD-618 701 Div. 8/1
CFSTI Prices: HC$6.00 MF$1.25

Sperry Gyroscope Co., Great Neck, N. Y. Radiation Div.
TRANSIENT BEHAVIOR OF LARGE ARRAYS.
Final rept. for 1 Mar-23 Nov 64,
by G. F. Ross, L. Susman, and J. Hanley. Jun 65, 241p
Rept. no. EB-5287-0500-3
Contract AF30 602 3348, Proj. 4506, Task 450604
RADC TR-64-581

Unclassified report

See also AD-612 597.

Descriptors: (*Antenna feeds, Microwave networks), (*Microwave networks, Transients), Waveguides, Waveguide couplers, Phase shifters, Power dividers, Mixers(Electronic), Electromagnetic fields, Electromagnetic lenses, Graphics, Mathematical analysis, Partial differential equations.

The report is the final report of a theoretical and experimental investigation of the transient behavior of microwave components used in feed networks of large antenna array systems. In particular, the initial phase of the investigation concentrated on the analysis of TEM mode components. Flow graph techniques were developed to yield exact solution to the transient behavior of such components as, branch line couplers, ring hybrids, power dividers, phase shifters, etc. The transient behavior was described in terms of the impulse, step, and modulated step response of the components. The 'real time' properties of time varying resistive networks were examined and an approximate solution to the transient response of a mixer was formulated. The second phase dealt with performing the aforementioned analysis on cascaded TEM components and applying the analysis techniques to various waveguide components individually and in cascade. Major emphasis during the third and the final phase of the investigation was placed on the completely distributed feed network, the Luneberg Lens. The entire investigation was paralleled by an experimental phase wherein the experimental results were critically compared to the theoretical analyses. (Author)

AD-618 702 Div. 8/1
CFSTI Prices: HC$1.00 MF$0.50

Scientific-Atlanta, Inc., Atlanta, Ga.
PRECISION ANTENNA PATTERN RECORDING TECHNIQUES, PHASE, II.
Quarterly interim rept. no. 3,
by Jack B. Chastain. Jun 65, 25p
Contract AF30 602 3425, Proj. 4506, Task 450604
RADC TR-65-85

Unclassified report

Descriptors: (*Antenna radiation patterns, Measurement), (*Electronic recording systems, Antenna radiation patterns), Microwave oscillators, Microwave equipment, Stability, Frequency stabilizers, Display systems, Ranges(Establishments), Digital-to-analog converters, Measuring devices(Electrical + electronic).

A study and investigation was made to prove the feasibility of precision amplitude- and angle-measuring devices, combined with sophisticated recording and display techniques, for antenna pattern measurements. The current program includes development of a stabilized transmitter, a precision, high data rate receiver and associated equipment, and continuation of the theoretical investigation reported under contract AF30(602)-2737. The transmitter and receiving equipment will be installed and tested at the USAF Antenna Proving Range at Newport, New York. (Author)

AD-618 704 Div. 8/2, 25/6
CFSTI Prices: HC$6.00 MF$1.50

Research Triangle Inst., Durham, N. C.
INTEGRATED SILICON DEVICE TECHNOLOGY. VOLUME VII. OXIDATION.
Technical rept.
Jun 65, 285p
Contract AF33 615 1998, Proj. 4159, Task 415906
ASD TDR-63-316 V7

Unclassified report

See also AD-613 951.

Descriptors: (*Semiconductor devices, Silicon), (*Silicon, Oxidation), Films, Oxides, Glass, Silicon compounds, Dioxides, Density, Refractive index, Crystal lattice defects, Porosity, Resistance(Electrical), Dielectric properties, Surface properties, Microminiaturization-(Electronics), Integrated circuits.

The common methods of growing oxide layers on silicon use either the high temperature reactions of silicon with steam (either in an open tube or a high pressure bomb), dry oxygen, wet oxygen, or the anodic reaction of silicon with various electrolytes or plasmas at room temperature or thereabout. The kinetics of each of these reactions is discussed and the results from typical experimental systems are presented. Oxide layers may also be deposited on the silicon surface by pyrolytic decomposition, reactive sputtering or vacuum evaporation. The effect of impurities upon the bulk physical and electrical properties of commercial glasses is discussed to suggest the type of variations

in properties that might be anticipated with similar variations of the impurity content of oxide layers. Oxides in silicon device technology are used for impurity masking during diffusion, surface protection and passivation, electrical isolation, and as regions of active and passive components probably for all applications in which the density of surface charge at the oxide-silicon interface is critical. Procedures for obtaining high quality thermal oxides and for measuring the thickness of any oxide layer on silicon conclude the report.

AD-618 706 Div. 30/2, 9/7, 1/2
CFSTI Prices: HC$5.00 MF$1.25

Electronic Systems Lab., Mass. Inst. of Tech., Cambridge.
A DEMONSTRATION HYBRID COMPUTER FOR REAL-TIME FLIGHT SIMULATION.
Final rept. for May 61-Aug 64,
by Mark E. Connelly and Oleg Fedoroff. Jun 65, 185p
Contract AF33 616 8363, Proj. 6114, Task 611408
AMRL TR-65-97

Unclassified report

Descriptors: (*Analog-digital computers, Flight simulators), (*Flight simulators, Analog-digital computers), (*Real time, Training devices), Digital computers, Special purpose computers, Computer logic, Computer storage devices, Programming-(Computers), Airplane models, Simulation, Digital-to-analog converters, Analog-to-digital converters.

A hybrid, real-time simulation facility has been designed, constructed, and demonstrated, using as a test vehicle the complete aerodynamic and engine equations for a high-performance military aircraft. The analog-digital configuration employs peripheral analog equipment to represent a linear, skeleton version of the aircraft and the PDP-1 digital computer to carry out engine simulation, decision management, and corrections for nonlinear effects. To provide an all-digital reference against which the hybrid simulation could be compared, the aircraft model, which in general scope is identical to the F-100A model used in the UDOFT studies, was also simulated on the PDP-1 alone. It was found that the solution rate of 20 per second employed in the all-digital study could be reduced to one per second without deleterious effects when the hybrid configuration was used. Such a reduction demonstrates that supplementing a digital computer by relatively inexpensive analog peripheral equipment in the manner suggested substantially increases the real-time capacity of the digital computer in complex simulation applications. Moreover, because a number of key variables are computed continuously in the analog domain, the introduction of analog equipment results in a net decrease in the complexity of the interface, particularly in the number of analog storage devices required. (Author)

AD-618 714 Div. 8/1, 8/2
CFSTI Prices: HC$2.00 MF$0.50

Rome Air Development Center, Griffiss AFB, N. Y.
TUNNEL DIODE OSCILLATOR ANTENNA.
Final rept.,
by John J. Patti. Jun 65, 46p
Rept. no. RADC-TR-65-218
Proj. 4519, Task 451901

Unclassified report

Descriptors: (*Antennas, S band), (*Microwave oscillators, Tunnel diodes), (*Tunnel diodes, Microwave oscillators), Stability, Spiral antennas, Conical antennas, Log periodic antennas, Sources, Radio signals, Performance(Engineering), Airborne, Model tests, Radio-frequency power, Frequency, Antenna radiation patterns.

The purpose of this effort was to develop a compact, lightweight, efficient S-band signal source for use with the project 'Balloon Boresighting Techniques,' DC 64-9. Theoretical studies were made with reference to the frequency neighborhood of operation, and to the stability of the tunnel diode oscillator-antenna, for the purpose of design. A study was also made to narrow and fix the neighborhood of operation. A test model 'Tunnel Diode Oscillator-Antenna' was constructed and tested. It was determined to have a frequency stability of about 1 part in 1000, put out approximately three milliwatts, have a power level stability better than one tenth of 1 db, and have a nearly omnidirectional antenna pattern. (Author)

AD-618 716 Div. 8/2, 26/1

International Rectifier Corp., Los Angeles, Calif.
PRODUCTION ENGINEERING MEASURE. HIGH VOLTAGE SILICON RECTIFIER STACKS.
Quarterly progress rept. no. 14, 24 Sep-24 Dec 64,
by Arnold Conn and E. J. Diebold. 24 Dec 64, 26p
Contract DA36 039SC85977

Unclassified report

Available only for reference use at DDC Field Services. Copy is not available for public sale. See also AD-614 446.

Descriptors: (*Rectifiers, Silicon), (*Diodes(Semiconductor), Rectifiers), Modules(Electronic), Electric discharges, Tanks(Containers), Performance(Engineering), Voltage, Specifications, Tests, Storage.

Serious difficulties were encountered in this quarter. Several tanks were found to have high values of leakage current when subjected to Group A hi-pot testing. In addition, two tanks arced internally due to either defective bushings or trapped air. New bushings were subjected to 200% of the voltage encountered in the hi-pot test and performed perfectly. A plexiglass cover was constructed to observe possible trapped air. It was determined that even with the most careful filling and vacuum treatment many air bubbles were trapped in the many crevices of the modules. In order to solve the problem of high dielectric leakage, modifications were made to the filling and process specification. These changes included more stringent drying procedures and vacuum techniques for removing air bubbles. A method of rocking the tanks was found to remove air bubbles trapped during the filling procedure. This method when checked with the plexi-glass cover proved to be very efficient and thorough. It is felt that the new procedure will solve the problems encountered during this quarter. (Author)

AD-618 718 Div. 8/2
CFSTI Prices: HC$4.00 MF$0.75

Silicon Transistor Corp., Long Island, N. Y.
PRODUCTION ENGINEERING MEASURE TO INCREASE THE RELIABILITY OF THE TRANSISTOR TYPE 2N2034. VOLUME II. QUALITY ASSURANCE MANUAL.
Final engineering rept. for 22 Jun 63-15 Mar 65,
by Vincent Lodestro. 15 Mar 65, 106p
Contract DA36 039AMC01482E

Unclassified report

See also AD-618 726.

Descriptors: (*Transistors, Reliability(Electronics)), (*Quality control, Transistors), Silicon, Processing, Test methods, Test equipment, Instruction manuals.

AD-618 719 Div. 8/2, 26/1
CFSTI Prices: HC$1.00 MF$0.50

Sprague Electric Co., North Adams, Mass.

PRODUCTION ENGINEERING MEASURE FOR IMPROVED RELIABILITY OF SOLID ELECTROLYTE TANTALUM CAPACITORS.
Quarterly rept. no. 7, 29 Dec 64-29 Mar 65,
by J. M. Eckfeldt and J. H. D. Folster. 29 Mar 65, 22p
Contract DA36 039AMC03621E

Unclassified report

See also AD-613 215.

Descriptors: (*Tantalum capacitors, Manufacturing methods), Production, Processing, Industrial equipment, Reliability(Electronics), Coatings, Soldering, Silver solders.

The production run of 9150 capacitors of nine different ratings was begun during this period, and the construction of test fixtures for life testing these capacitors was finished. Evaluation of all the mechanized assembly equipments was completed during this period. All seven mechanisms have been employed in the production run. Matrix testing during this period confirmed the value of a new high-temperature silver paste and the benefits of machine-soldering the capacitors and covers to the cases. (Author)

AD-618 722 Div. 8/2, 5/2
CFSTI Prices: HC$3.00 MF$0.75

Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
ELECTRONIC EQUIPMENT INTERFERENCE CHARACTERISTICS-COMMUNICATION TYPE.
Quarterly rept. no. 8, 15 Jan-15 Apr 65,
by William R. Free and Charles W. Stuckey.
15 May 65, 80p Rept. no. 29
Contract DA36 039AMC02294E, Projs. 1G6 20501D449, A678

Unclassified report

Continuation of Contract DA36 039sc87183.

See also AD-614 803.

Descriptors: (*Electronic equipment, Radiofrequency interference), (*Radiofrequency interference, Measurement), (*Communication equipment, Radiofrequency interference), Electromagnetic fields, Antennas, Electromagnetic shielding, Multipath transmission, Antenna components, Broadband, Anechoic chambers, Absorption, Compatibility, Impedance matching, Communication equipment, Army equipment.

Investigations were made to determine the most economical and practical means for establishing a controlled electromagnetic environment for measuring near-field radiated and susceptibility interference characteristics of electronic equipments and to develop techniques for measuring near-field radiated and susceptibility interference characteristics of electronic equipments in the above controlled electromagnetic environment which can be correlated with 'open-field' measurements. Two techniques, the Hooded Antenna Technique and a Paraboloidal-Section Shaped Enclosure, show considerable promise as a means of obtaining the desired controlled environment. Descriptions and evaluations of these techniques are discussed in detail. A model of a conventional shielded enclosure was evaluated in considerable detail to provide a reference for evaluating the hooded antenna technique and the paraboloidal-section enclosure. The model enclosure was also utilized to evaluate absorbing materials and the placement of absorbing materials in a conventional shielded enclosure. A description of the antenna coupling technique utilized in these evaluations, as well as the data resulting from these evaluations are discussed.

AD-618 726 Div. 8/2
CFSTI Prices: HC$4.00 MF$1.00

Silicon Transistor Corp., Long Island, N. Y.
PRODUCTION ENGINEERING MEASURE TO INCREASE THE RELIABILITY OF THE TRANSISTOR TYPE 2N2034. VOLUME I. PROCESS IMPROVEMENTS.
Final engineering rept. for 22 Jun 63-15 Mar 65,
by G. J. Chesnes, F. Des Roches, D. Hughes, and A. Palmerini. 15 Mar 65, 142p
Contract DA36 039AMC01482E

Unclassified report

See also AD-618 718.

Descriptors: (*Transistors, Reliability(Electronics)), Silicon, Life expectancy, Specifications, Processing, Cleanings, Soldering, Chemical milling, Encapsulation, Welding, Hermetic seals, Tests, Production.

Results of the production run are reported and the operating life test data indicates that the reliability goal of the contract was met. As a result of the contract, a Military type Specification or an improved Transistor Type 2N2034 was written and approved. A set of complete process specifications and an approved Quality Assurance Manual are included. (Author)

AD-618 735 Div. 8/2
CFSTI Prices: HC$1.00 MF$0.50

Microwave Device and Physical Electronics Lab., Univ. of Utah, Salt Lake City.
CYCLOTRON WAVE DEVICES STUDY.
Quarterly progress rept. no. 7, 1 Jan-31 Mar 65,
by T. Kao, D. C. Watson, C. H. Durney, C. C. Johnson, and R. W. Grow. 31 Mar 65, 20p
Contract DA36 039AMC02372E, Proj. 1P6 22001A055, Task 1P6 22001A055 04

Unclassified report

Descriptors: (*Cyclotron waves, Microwave amplifiers), (*Microwave amplifiers, Cyclotron waves), Rectifiers, Effectiveness, Radiofrequency power, Pumping(Electronics).

The reassembled cyclotron-synchronous wave amplifier was tested with little improvement. The experimental results indicate that further tests should be conducted with an optimum rho/rho sub br ratio at higher power levels. The cyclotron-wave power converter was operated to the three-watt level, and saturation results were observed which agree closely with theoretical predictions. The a-c characteristics of the device were examined. Present conversion efficiencies are somewhat lower than first reported. (Author)

AD-618 738 Div. 8/2
CFSTI Prices: HC$5.00 MF$1.00

General Electric Co., Syracuse, N. Y. Electronics Lab.
INVESTIGATION OF FERRITE PHASE-SHIFTERS AT C- AND X-BAND.
Final rept. for 1 Jul 64-30 Jun 65,
by Robert Seckelmann. Jul 65, 174p
Contract AF30 602 3482, ARPA Order 550

Unclassified report

See also AD-609 813.

Descriptors: (*Phase shifters, Ferromagnetic materials), C band, X band, Phase shift, Magnetic properties, Dielectrics, Radio fields, Waveguides,

Magnetic cores, Theory, Propagation, Wave transmission, Mathematical analysis.

The phase shifters discussed are nonreciprocal. They contain circumferentially magnetized ferrite cylinders, which work at remanence. The differential phase shift is controlled by partial magnetization of the ferrite, achieved by controlled flux transfer. Three problems, common to all such phase shifters are dealt with: The efficiency of flux transfer and the possibility to add flux bits. Experimental data and a theory in agreement with these data are presented. The determination of r-f magnetic threshold fields above which the losses of ferrites increase with field strength. The threshold is calculated from the measured threshold power of guides completely or in part filled with ferrite. The influence of waveguide and ferrite dimensions on the frequency dependence of the differential phase shift, on the proportionality between phase shift and transferred flux, and on the peak power handling capability is investigated experimentally. Slabline and waveguide type devices have been used. (Author)

AD-618 739 Div. 7/5, 7/2
CFSTI Prices: HC$1.00 MF$0.50

Holman (John F.), Co., Inc., Washington, D. C.
THE INVESTIGATION OF THE ELECTRO-MECHANICAL TRANSIENT PROCESSES IN FREQUENCY-CONTROLLED SYNCHRONOUS, REACTION-TYPE ELECTRIC MOTORS BY MEANS OF ELECTRONIC SIMULATION DEVICES,
by B. A. Egorov. Aug 65, 17p
Contract DA44 009AMC930T, Proj. 1C022 001A012
AERDL T-1796-65, TT 65-62793
Unclassified report

Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Elektromekhania (USSR) v7 n7 p848-57 1964.

Descriptors: (*Electric motors, Simulation), (*Transients, Electric motors), Synchros, Voltage, Frequency, Power, Synchronization(Electronics), Electrical impedance, Resistance(Electrical), USSR.

The simulation by electronic means makes possible analysis of the operation of frequency controlled synchronous reaction-type electric motors in transient states with known variations of voltage and frequency in those cases where the acceleration of the slip may be neglected.

AD-618 794 Div. 30/2, 8/7

Moore School of Electrical Engineering, Univ. of Pennsylvania, Philadelphia.
SPECIFICATION LANGUAGES FOR MECHANICAL LANGUAGES AND THEIR PROCESSORS, A BAKER'S DOZEN. A SET OF EXAMPLES PRESENTED TO ASA X3.4 SUBCOMMITTEE,
by Saul Gorn. 1961, 12p
Contract AF49 638 951; Grant G14096
Unclassified report

Pub. in Communications of the Association for Computing Machinery v4 n12 p532-42 Dec 1961 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Programming languages, Standardization), (*Computers, Communication theory), (*Communication theory, Computers), Language, Computer logic, Specifications, Automata.

Five classes of specifying languages are shown that are capable of specifying mechanical languages or their processors; groups within each class are mechanically translatable into one another, translation between the groups being accomplished heuristically. (1) Natural language. (2) Examples of language specification: regular expression (a linear sequential language of strings of characters chosen from a set alphabet); Backus normal form, designed for generative syntactic specification of digital linear sequential mechanical languages; trees, a 2-dimensional language for syntactic structural specification; and prefix language. (3) Examples of languages for processor specification: state diagrams, a 2-dimensional language for processor specification (mainly behavioral); symbol-state diagram, similar to state diagrams, but requiring 2 directed graphs/processor; and incidence matrix. (4) Logical net language; propositional logic with time variable; logical equivalents; Turing machines. (5) Flow charts.

AD-618 824 Div. 8/1, 25/3

Brown Univ., Providence, R. I.
THE FARADAY AND ALLIED EFFECTS IN CIRCULAR WAVEGUIDES,
by J. E. Adkins and R. S. Rivlin. 26 Feb 62, 13p
Grant NSF G21347
Unclassified report

Pub. in International Journal of Engineering Science v1 p187-98 1963 (Copies available only to DDC users).

Descriptors: (*Waveguides, Magneto-optic effect), (*WMagneto-optic effect, Waveguides), Electromagnetic waves, Propagation, Dielectrics, Harmonic analysis, Electrostatic fields, Magnetic fields.

The propagation of electromagnetic waves, along a circular cylindrical waveguide containing a holohedral isotropic material under the influence of applied static, electric and magnetic fields, is investigated. The constitutive equations employed are based upon those derived by Toupin and Rivlin for such materials. The applied static fields are assumed uniform and directed along the waveguide axis. An exact solution of the problem is obtained and the speed of propagation and rate of rotation of the wave is investigated. (Author)

AD-618 825 Div. 30/2

Air Force Cambridge Research Labs., Bedford, Mass.
DEBUG. AN EXTENSION TO CURRENT ONLINE DEBUGGING TECHNIQUES.
Physical and mathematical sciences research papers,
by Thomas G. Evans and D. Lucille Darley.
Nov 64, 13p Rept. nos. AFCRL-65-411, PMSRP-110
Proj. 4641, Task 464102
Unclassified report

Pub. in Communications of the ACM v8 n5 p321-6 May 1965 (Copies not available to DDC or Clearinghouse customers).
Prepared in cooperation with Bolt, Beranek, and Newman, Cambridge, Mass.

Descriptors: (*Programming(Computers), Corrections), Programming languages.

A method for online assembly-language debugging which greatly simplifies several of the bookkeeping tasks characteristically associated with that process has been developed and implemented in a program for the UNIVAC M-460 computer at Air Force Cambridge Research Laboratories. With this program, an online user may insert ot delete (in symbolic assembly language) any number of lines at any point of his previously assembled program in core, with the remainder of the program being relocated appropriately. (Author)

AD-618 880 Div. 30/2
CFSTI Prices: HC$1.00 MF$0.50

Army Electronics Command, Fort Monmouth, N. J.
THE COBOL COMPILER: OPTIMIZING MILITARY COMPUTER OPERATION.
Technical rept.,
by Norman J. Taupeka. Mar 65, 22p
Rept. no. ECOM-2586
Proj. 1X6 40603D494, Tasks 1X6 40603D494 03, 1X6 40603D494 03 02

Unclassified report

Descriptors: (*Compilers, Army equipment), (*Computers, Armed forces supplies), Programming languages, Programming(Computers), Digital computers, Optimization, Magnetic tape, Errors, Mobile, Computer storage devices, Logistics.

This report presents in basic engineering terminology a description of the recent development of a COBOL compiler for use with the U. S. Army's militarized MOBIDIC (MOBile DIgital Computer). The process of compiler translation and compilation of an English language type Source Program into an Object Program is discussed. The major benefits derived from the use of the COBOL compiler are explained, i.e., (1) documentation, (2) minimization of training, and (3) 4:1 reduction in programming time. Development problems and their solutions are discussed. The reason, location, and treatment of compilation errors are provided. During acceptance test, the compiler was first evaluated by utilizing diagnostic type programs, then typical application data processing programs were computed and evaluated. A recapitulation is provided which emphasizes the main benefits achieved by the U. S. Army thus far in optimizing their military computer operation. The conclusion summarizes the report and projects further logistic applications of the COBOL compiler at other installations, and applications into other phases of the CCIS-70 Program such as Personnel and Administration and Intelligence. (Author)

AD-618 912 Div. 8/7, 30/2
CFSTI Prices: HC$1.00 MF$0.50

Rome Air Development Center, Griffiss AFB, N. Y.
AN INTRODUCTION TO CODES FOR QUANTIZED FREQUENCY TRANSMISSIONS.
Technical rept. for Jan-Jun 65,
by Alfred S. Kobos. Jun 65, 18p
Rept. no. RADC-TR-65-250
Proj. DC64 37

Unclassified report

Descriptors: (*Communication systems, Digital systems), (*Coding, Communication systems), Modulation, Wave transmission, Sequences, Communication theory, Frequency shift keyers, Digital computers.

Possible code structures which can be utilized in systems using quantized frequency transmission as a modulation technique are discussed. Simple examples of codes are shown, and a general approach to a study of this area is suggested. Two specific codes are exhibited; one is a equal-distance maximum-distance code which contains the largest possible number of words, and the other is a code derivable from maximum length pseudo-random sequences. Being a preliminary report, only the most elementary notions are presented, and an introduction to the subject is developed, without extensive investigation of all possible facets of this subject. (Author)

AD-618 913 Div. 8/2, 7/2, 30/3
CFSTI Prices: HC$2.00 MF$0.50

Giannini Controls Corp., Duarte, Calif.
BRUSHLESS PRECISION POTENTIOMETER.
Interim development rept. for 5 Feb-30 Jun 65.
22 Jul 65, 38p Rept. no. ER-8645-4
Contract NObsr 91175

Unclassified report

See also AD-613 213.

Descriptors: (*Potentiometers, Photoelectric effect), Photoelectric materials, Photosensitivity, Metal films, Vapor plating, Vacuum apparatus, Encapsulation, Resistance(Electrical), Silicone plastics, Silicates, Organic compounds, Aluminum compounds, Oxides, Cadmium compounds, Sulfides.

Conclusions: Two satisfactory methods of encapsulation which will prevent deterioration of the photoconductive element have been proven. The temperature coefficient of resistance was found to be an inverse function of the absolute value of input resistance. Analysis of data indicates that the temperature coefficient may be kept within specification for all absolute values of resistance by varying the width of the resistive element. Modification of evaporation masks is necessary to enable manufacture of elements within linearity requirements. Utilizing materials and processes established during the program, a prototype potentiometer was fabricated and preliminary evaluation provides confidence that with design refinement, the potentiometer is capable of meeting the design specification. (Author)

AD-618 914 Div. 8/7
CFSTI Prices: HC$3.00 MF$0.75

Sylvania Electronic Systems, Waltham, Mass.
Applied Research Lab.
CYCLIC CODES (RESEARCH PROGRAM TO EXTEND THE THEORY OF WEIGHT DISTRIBUTION AND RELATED PROBLEMS FOR CYCLIC ERROR-CORRECTING CODES AND CONSTRUCTIVE CODING THEORY).
Summary scientific rept. no. 4,
by E. F. Assmus, H.F. Mattson, and R. Turyn.
28 Apr 65, 92p Rept. no. S-1015-4
Contract AF19 604 8516, Proj. 5628, Task 562801
AFCRL 65-332

Unclassified report

See also AD-607 445.

Descriptors: (*Coding, Groups(Mathematics), (*Scientific research, Coding), Communication theory, Optimization, Errors, Corrections, Algebra, Number theory.

This document reports on work done in the period July 1964-April 1965 on error-correcting codes and questions arising in the study of them. In a major section, devoted to follow-up and additions to the 1964 Report, even lower weights in quadratic-residue codes were found in continuing the study using cyclotomic numbers. The proof that all but a finite number of cyclic codes are optimal has been greatly simplified, and by the application of a result available even in the 1964 Report. In addition, the question of the action of the projective unimodular group on the extended quadratic-residue codes is treated. A determination of the weight distribution in optimal codes is made, and a proof is given of the fact that, except for the obvious exceptions, optimal codes are never perfect. One section relates the known perfect codes (other than Hamming codes) and the Mathieu groups; it will be published in the Archive der Mathematik. Another section contains general results relating perfect codes to Steiner systems, complete Steiner systems, and tactical configurations. (Author)

AD-618 915 Div. 8/2, 8/3, 8/6
CFSTI Prices: HC$3.00 MF$0.75

Melabs, Palo Alto, Calif.
INVESTIGATION OF MICROWAVE NON-LINEAR EFFECTS UTILIZING FERROMAGNETIC MATERIALS.
Final rept. for 17 Mar 62-16 Feb 65,
by Lee F. Donaghey and Roy W. Roberts, Jr.
16 Feb 65, 96p
Contract DA36 039SC89206, Proj. 1P6 22001A055, Task 1P6 22001A055 05

Unclassified report

Descriptors: (*Microwave equipment, Nonlinear systems), (*Parametric amplifiers, Ferromagnetic materials), (*Ferromagnetic materials, Parametric amplifiers), (*Garnet, Parametric amplifiers), K band, Yttrium compounds, Iron compounds, Pumping(Electronics), Waveguides, Noise, Geometric forms, Resonators, Dielectrics, Magnetic properties.

Ferrite parametric amplification was demonstrated in Ku band with Yttrium Iron Garnet (YIG). A detailed theoretical analysis was derived which allows comparison between the ferrite amplifier and the diode amplifier. In theory, both amplifiers have similar threshold pump powers. Diode Q's are generally lower than YIG Q's. Furthermore, diode Q's decrease with increasing frequency while YIG Q's increase or at least remain constant. Off-setting this is the fact that diodes have a much larger non-linear coupling term. Furthermore, this non-linear coupling term remains constant with increasing frequency for the diode, whereas it decreases for the ferrite. Magnetodynamic mode operation is demonstrated as a useful method of operation of the ferrite amplifier, having some of the advantages, as well as disadvantages, of both the electromagnetic and magnetostatic modes of operation. Magnetodynamic operation is further broken down into three types depending on the position of the signal and idler modes relative to the Walker magnetostatic spectrum. (Author)

AD-618 916 Div. 8/4
CFSTI Prices: HC$3.00 MF$0.75

Michigan Univ., Ann Arbor. Electron Physics Lab.
INVESTIGATION OF LARGE-SIGNAL KLYSTRON AND TRAVELING-WAVE DEVICES.
Quarterly progress rept. no. 2, 1 Dec 64-28 Feb 65,
by G. T. Konrad and J. E. Rowe. Jun 65, 65p
Contract AF30 602 3569, Projs. 5573, 06847, Task 557303
RADC TR-65-151

Unclassified report

See also AD-615 150.

Descriptors: (*Klystrons, Performance(Engineering)), (*Traveling-wave tubes, Performance(Engineering)), Theory, Space charges, Nonlinear systems, Boundary valve problems, Electron beams, Focusing, Backward-wave oscillators, S band, Magnetrons, Electron guns, Noise(Radio), Ultrahigh frequency, Stability.

Solutions obtained from the digital computer on nonlinear interaction equations for Brillouin focused linear-beam devices are described. It is possible to handle both uniform as well as varying axial magnetic fields. Harmonic current amplitudes are shown for the former case. The specification of initial and boundary conditions on the nonlinear boundary-value solution for electron and plasma devices presented some difficulties. Methods for overcoming these problems are shown. Simplifying assumptions in the stability problem of beams in the presence of large r-f signals are described. It is the goal to find closed-form solutions of the simplified system of equations. A similar approach is being undertaken in the case of start-oscillation conditions of backward-wave oscillators. The phase velocity taper for a ring-and-bar tube has been chosen. The impedance variation and velocity profiles for this circuit are shown. Some saturation data for the untapered tube is presented. Results obtained from a relativistic electron gun program are described. A highly convergent gun with a converging magnetic field was used in the case considered to date. Design considerations and expected operating parameters for a UHF tube using a magnetron injection gun are presented. (Author)

AD-618 917 Div. 8/1, 25/3
CFSTI Prices: HC$2.00 MF$0.50

Airborne Instruments Lab., Deer Park, N. Y.
MILLIMETER AND SUBMILLIMETER COMPONENT DEVELOPMENT.
Quarterly rept. no. 4, Dec 64-Feb 65,
by J. J. Taub, J. Cohen, H. J. Hindin, G. Kurpis, B. Peyton. Jul 65, 50p
Contract AF30 602 3343, Proj. 5573, Task 557304
RADC TR-65-163

Unclassified report

See also AD-618 402.

Descriptors: (*Millimeter waves, Waveguides), (*Waveguides, Millimeter waves), Waveguide filters, Ferrites, Diodes(Semiconductors), Demodulators, Rotation, Mixers(Electronic), Impedance matching, Dielectrics, Transmission lines, Semiconductors, Indium alloys, Antimony alloys.

Single-resonator and double-resonator grating filters were investigated at 300 Gc. Also investigated were designs for broadening the stop-band region of the dielectric slab filters. Work has continued on Faraday rotation in oversize waveguide. The isolator structure has been redesigned. Tangential sensitivity measurements were made of the diode waveguide detectors to compare the standard and oversize mounts. Additional envelope detection and superheterodyne mixer experiments using bulk semiconductors were performed and improved performance was obtained using optimized InSb material. A conversion loss approaching 9 db has been obtained. (Author)

AD-618 924 Div. 8/4, 26/1

Bomac Div., Varian Associates, Beverly, Mass.
BL-221 70 Gc MAGNETRON. PRODUCTION ENGINEERING MEASURES PROGRAM.
Final rept. Sec-2, Vol-2,
by Robert C. Sibley. 23 Sep 59, 135p
Contract DA36 039SC85974

Unclassified report

Available only for reference use at DDC Field Services. Copy is not available for public sale.
See also AD-271 535, AD-601 744, AD-618 929.

Descriptors: (*Magnetrons, Manufacturing methods), Production, Specifications.

Contents:
Process flow charts
Part and assembly drawings
Tool, jig and fixture drawings.

AD-618 927 Div. 8/2
CFSTI Prices: HC$1.00 MF$0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
FRINGING CAPACITANCES FOR OFFSET COUPLED

STRIPS IN SHIELDED STRIP LINE.
Technical note,
by William J. Getsinger. 1 Jul 65, 10p
Rept. no. TN-1965-33
Contract AF19 628 5167
ESD TDR-65-273

Unclassified report

Descriptors: (*Coupling circuits, Capacitors), (*Capacitors, Coupling circuits), Electromagnetic shielding, Conformal mapping.

Even- and odd-mode fringing capacitances are presented for a widely used strip-line configuration that consists of two overlapping thin strips parallel to but not centered between ground planes. All the fringing capacitances are presented in terms of a single function, which is plotted for convenience. (Author)

AD-618 929 Div. 8/4, 26/1
CFSTI Prices: HC$4.00 MF$0.75

Bomac Div., Varian Associates, Beverly, Mass.
BL-221 70 Gc MAGNETRON: PRODUCTION ENGINEERING MEASURES PROGRAM.
Final rept. sect. 1 and 3, vol. 1, 6 Aug 61-6 May 64,
by Robert C. Sibley. 6 May 64, 104p
Contract DA36 039SC85974

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.
See also AD-601 744, AD-618 924.

Descriptors: (*Magnetrons, Manufacturing methods), Production, Cathodes(Electron tubes), Anodes(Electron tubes), Positioning devices(Machinery), Frequency, Tuning devices, Quality control, Tests, Finishes + finishing.

Production Engineering Measures were applied to the 70 Gc magnetron developed on a previous R and D contract. The four major changes in the tube and process design were (1) a change from a glass output window to a ceramic output window, (2) an improved integral cathode centering device, (3) additional finish treatment of assembly to prevent corrosion in storage and (4) increased vacuum and other cleaning processing of internal parts to improve life. Studies were made on frequency tunability, and integral ion pump appendage modifications. These were not incorporated. A specification in the MIL Format was proposed and approved and the tube was registered under the number 8558. A hobbed anode manufacturing facility and capability was established at Bomac as a second source to other such facilities. Bomac's facility is established to perform hot hobbing and is at present being used to make anodes from 16 to 70 Gc. Preproduction Approval Testing was performed on five tubes with no failures and the procedures and data are included. (Author)

AD-618 931 Div. 30/2
CFSTI Prices: HC$2.00 MF$0.50

System Development Corp., Santa Monica, Calif.
A USER-ORIENTED PRIORITY SCHEME FOR A TIME-SHARING SYSTEM,
by Robert A. Totschek. 14 Jun 65, 35p
Rept. no. SP-2111
Contract SD-97

Unclassified report

Descriptors: (*Programming(Computers), Scheduling), (*Computers, Scheduling), Automatic.

Time-sharing systems have yielded large payoffs in computer program production by providing fast turnaround and interactive debugging. Corporations or institutes that install time-sharing systems will find that their systems will soon be saturated with users. Until the system capacity is expanded, by means of hardware or software changes, it may be desirable to implement a priority system that will facilitate work on critical projects and insure the meeting of deadlines. This paper discusses the criteria for a time-sharing priority scheme and presents some techniques for superimposing a priority scheme upon a typical time-sharing configuration. The scheme has three primary priorities: HIGH, LOW, and NO. Users are allocated budgets of HIGH and LOW priority time for the succeeding month based upon their current forecast and previous usage. All users are given unlimited NO priority time. The salient feature of the scheme is that the users determine when and at which priority they will operate. Some examples of the budget allocation process are included. (Author)

AD-618 933 Div. 30/2
CFSTI Prices: HC$3.00 MF$0.75

Mitre Corp., Bedford, Mass.
LOGICAL DESIGN FOR FAST SERIAL COMPUTER.
Technical rept.,
by H. B. Enderton. Jul 65, 82p
Rept. no. W-07189
Contract AF19 628 2390, Proj. 508
ESD TR-65-81

Unclassified report

Descriptors: (*Digital computers, Design), (*Computer logic, Digital computers), Computer storage devices, Relaxation oscillators, Circuits, Input-output devices.

The detailed logical design is given for a serial digital computer using a 0.5-microsecond magnetic memory, 100-mc logical circuits, and one-word delay lines. The computer performs most instructions in 1 microsecond. A list is given of the amount of hardware used. (Author)

AD-618 934 Div. 8/2, 30/2
CFSTI Prices: HC$3.00 MF$0.75

Texas Instruments, Inc., Dallas.
PRODUCTION ENGINEERING MEASURES (PEM) FOR MICROELECTRONIC CIRCUITRY AND MILLIWATT LOGIC SEMICONDUCTOR INTEGRATED CIRCUITS.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 65,
by D. W. Brooks and A. J. Stein, Jr. 31 Mar 65,
54p Rept. no. TI-03-65-46
Contract DA36 039AMC03637E

Unclassified report

Descriptors: (*Computer logic, Integrated circuits), (*Microminiaturization(Electronics), Circuits), (*Circuits, Microminiaturization(Electronics)), Semiconductors, Gates(Circuits), Delay circuits, Relaxation oscillators, Production, Testing, Performance(Engineering), Quality control.

Devices showing considerable improvement in diode leakage were produced during the third quarter. Increased temperature stabilization of the material brought the diode leakages down to less than 10 uuamp for the standard gate and power gate. Additional gold doping decreased the propagation delay on the standard gate from 25 nsec to 12 nsec at 125C. Delay elements which met specifications were also shipped. Additional gold

doping will be incorporated to decrease storage time. Activities in the Material Preparation area centered around evaluation of the 'Common Carrier'. Improvements were made in several operations in the Bar Preparation and Assembly Areas and improvement programs were begun in the functional probe and bar mount operation. The automatic switching time test station was completed and turned over to Manufacturing. (Author)

AD-618 937 Div. 30/2
CFSTI Prices: HC$2.00 MF$0.50

System Development Corp., Santa Monica, Calif.
PRESERVATION OF LANGUAGES BY TRANSDUCERS.
Scientific rept.,
by Seymour Ginsburg and Gene F. Rose. 15 Mar 65, 42p Rept. nos. SR-3; TM-738/013/00
Contract AF19 628 3418, Proj. 5632, Task 563205
AFCRL 65-402
Unclassified report

Descriptors: (*Transducers, Computer storage devices), (*Programming languages, Transducers), Linear systems, Set theory, Automata, Programming-(Computers), Language.

A linear bounded transducer (pushdown transducer) is a linear bounded automaton (pushdown automaton) with outputs. Answers to the following two problems are derived: (1) If S is a linear bounded transducer or a pushdown transducer, and L is context sensitive, context free, or regular; is S(L) some well known type of set (2) Does there exist a decision procedure to determine for arbitrary sets L sub 1 and L sub 2, both context sensitive or both context free, whether there exists a linear bounded transducer (pushdown transducer) which maps (a) L sub 1 onto L sub 2 or (b) L sub 1 into L sub 2 nontrivially. (Author)

AD-618 952 Div. 30/2, 32/3, 32/2, 5/1
CFSTI Prices: HC$2.00 MF$0.50

System Development Corp., Santa Monica, Calif.
SEMIANNUAL TECHNICAL SUMMARY REPORT TO THE DIRECTOR, ADVANCED RESEARCH PROJECTS AGENCY FOR THE PERIOD 18 NOVEMBER 1964 THROUGH 17 MAY 1965.
Technical memo.,
ed. by C. Baum. 17 May 65, 19p
Rept. no. TM-687/004/00
Contract SD97 Unclassified report

Descriptors: (*Data processing systems, Command + control systems), (*Computers, Command + control systems), Programming languages, Programming-(Computers), Systems engineering, Display systems, Language, Analysis.

This report describes work done in the Command Research Project. The report is organized by major contractual tasks. A summary of the professional activities of the staff is included at the end of the report. Documentation of the program is reported for each project. Upon provision of appropriate need to know, all referenced documents will be made available to requesting organizations. In addition to documenting the work with written reports, film footage has been taken of several of the projects presently or previously supported under this contract. The footage is currently being integrated into technical-report films, to be available in the near future, on the following subjects: Command Research Laboratory, The COMMAND Model, SIMNAVPLOT (Simulated Naval Plot), Variable Display, and General Purpose Display System. (Author)

AD-619 018 Div. 30/2, 28/5, 15/1
CFSTI Prices: HC$3.00 MF$0.75

System Development Corp., Santa Monica, Calif.
REPORT ON A MATING COMBINATIONS PROGRAM.
Professional paper,
by G. W. Baylor. 4 Jun 65, 68p Rept. no. SP-2150
Unclassified report

Descriptors: (*Programming(Computers), Game theory), (*Game theory, Decision making), Simulation, Behavior, Psychology.

This paper describes a computer program that analyzes chess positions that contain checkmating combinations. Over the range of positions the program can handle, the program is viewed as a psychological model of human problem-solving behavior. The model has a set of mechanisms for generating a small, highly selective set of moves for analysis and a search strategy for conducting the chess analysis. These parallel the human chess player's search behavior on several points: particularly on the quality of the moves considered and on the heuristics and stop-rules for keeping the everbranching tree of move possibilities within manageable limits. Some specific hypotheses about the chessmaster's perceptual abilities are offered to account for the quality of the moves that come under consideration while some hypotheses about uncertainty reduction and the nature of the constraints imposed by immediate memory are suggested to account for some of the structural facets of the thought process. These derive from the detailed process comparison of a human's behavior with the model's. On a performance measure the program has discovered some of the most sparkling combinations in the chess literature, in positions requiring analyses ranging from two to eight moves in depth. (Author)

AD-619 019 Div. 30/2
CFSTI Prices: HC$2.00 MF$0.50

System Development Corp., Santa Monica, Calif.
THE MANAGEMENT OF INFORMATION PROCESSING.
Professional paper,
by George F. Weinwurm. 15 Jul 65, 40p
Rept. no. SP-1992/000/01
Unclassified report

For presentation at the Symposium on Economics of Automatic Data Processing, to be sponsored by the International Computation Centre, Rome, Italy, 19-22 Oct 64.

Descriptors: (*Data processing systems, Management engineering), (*Computers, Management engineering), Computers, Management control systems, Real time, Programming(Computers).

The measurement of economic activity and value naturally rests on the availability of reasonably precise and generally available definitions of the types of tasks to be undertaken, and standards by which their performance can be compared. The greatest difficulty in managing information processing at present is simply that such definitions and standards either do not exist or are not generally accepted. Those delineations of information processing tasks that are common to the literature have evolved in response to the needs of diverse disciplines--such as accounting, computer programming, control engineering, etc.--under dissimilar conditions, and have not been related in any meaningful way. The present paper is in four parts. The first part presents some inherent difficulties in resolving these different viewpoints toward the end of developing measures and standards for management in the field of information processing. The second part considers the notion of 'real time' as an exam-

ple of a terminological problem, and the difficulties that are apparent in using the term as a means of classifying systems. The third part suggests an alternate way of describing the relation of information processing tasks to a dynamic environment. The fourth part summarizes the point of view of the paper. (Author)

AD-619 025 Div. 8/2, 8/5
CFSTI Prices: HC$1.00 MF$0.50

Pacific Missile Range, Point Mugu, Calif.
DISCUSSION OF DROPOUT CRITERIA FOR MAGNETIC TAPE.
Technical note,
by J. Roanhaus. 4 Aug 65, 11p Rept. no. PMR-TN-65-2
Unclassified report

Descriptors: (*Magnetic tape, Contamination), (*Military requirements, Magnetic tape), Magnetic recording systems, Telemeter systems, Effectiveness, Cleaning.

An investigation was conducted to determine the nature and cause of magnetic tape 'dropouts' (short-duration decreases in signal amplitude) and their effect on analog data. Results of the tests indicated that more realistic dropout standards should be adopted for recertified tape used for analog recording. It was determined that the largest single cause of dropouts is the presence of foreign material adhering to the oxide surface of the tape. It is recommended that the dropout standards for recertified analog tape be established at 18 db in depth and 100 microseconds in width. The tape should be thoroughly cleaned before it is checked for dropout content. (Author)

AD-619 040 Div. 8/3, 30/3
CFSTI Prices: HC$2.00 MF$0.50

National Bureau of Standards, Boulder, Colo.
PERFORMANCE MEASUREMENTS ON THE NM-52A FIELD INTENSITY METER.
Interim technical rept. no. 1, Jan-Jun 64,
by Archie H. Dove. Jun 65, 47p
Contract AF30 602 2936, Proj. 4540, Task 454001
RADC TR-65-29
Unclassified report

Descriptors: (*Radio receivers, Performance(Engineering)), (*Radio fields, Intensity), (*Radiofrequency, Voltmeters), (*Radiofrequency interference, Measurement), Ultrahigh frequency, Calibration, Reliability, Antennas, Tests.

The report briefly reviews the procedures and results of measurements performed on the FIELD INTENSITY METER, NM-52A, Serial number 312-18, which covers the frequency range of 375 MHz to 1000 MHz. Performance measurements of the meter were conducted to determine the accuracy of the instrument and its ability to furnish factual data on radio frequency fields. These measurements are to be used for reference and evaluation and to correlate with other instruments performing the same type of tests in the same environment. An effort was made to describe tests which affect field-strength measurements and to supplement the conclusions with calibration charts and curves. (Author)

AD-619 043 Div. 8/1, 25/4, 8/5
CFSTI Prices: HC$4.00 MF$1.00

National Co., Inc., Melrose, Mass.
STUDY AND INVESTIGATION OF A PROTON MASER ANTENNA.
Final rept.,
by Alexander Ganssen, Earl L. Sloan, III, Wayne Ledder, and Jonathan C. Webster. Apr 65, 128p
Contract AF30 602 2908, Proj. 4519, Task 451904
RADC TR-64-567
Unclassified report

Descriptors: (*Antennas, Masers), (*Masers, Protons), (*Frequency modulation, Masers), Nuclear magnetic resonance, Extremely low frequency, Noise(Radio), Sidebands, Amplitude modulation, Free radicals, Pumping-(Electronics), Magnetic fields.

A new concept in a low frequency magnetic field sensor (the proton maser antenna) is presented. The basic theory of the Promant operation is explored and calculations are given for the threshold sensitivity in terms of the system parameters. The response of the Promant was studied in the frequency range from dc to 1000 c/s. The general details of the theoretically predicted behavior were realized with a breadboard model (Promant). Although the Promant was tested within a screen room, which provided a 23db attenuation of external low frequency magnetic fields, indications are that the ambient noise background of the industrial environment was so high as to affect the measurements of ultimate sensitivity. With broad band filtering spurious responses are often obvious and can be disregarded. However, as more restricted bandwidths are employed the problem of discerning between internal noise and external activity becomes impossible. Under such conditions with a .08c/s bandwidth at 40c/s, a test signal of .0051 could be observed against the total background. The present research effort has shown that Promant is an extremely sensitive low frequency magnetic field sensor. (Author)

AD-619 049 Div. 8/2
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., Auburn, N. Y. Semiconductor Products Dept.
RESEARCH AND DEVELOPMENT OF SILICON CONTROLLED RECTIFIERS FOR HIGH FREQUENCY AMPLIFIER APPLICATIONS.
Quarterly progress rept. no. 3, 16 Apr-16 Jul 65.
16 Jul 65, 40p
Contract NObsr91299, Proj. SR0080304, Task 9348
Unclassified report

See also AD-615 037.

Descriptors: (*Rectifiers, Silicon), (*Silicon, Rectifiers), Amplifiers, High frequency, Performance(Engineering), Voltage, Electric currents, Test equipment.

The approach to the problem of obtaining the specified dv/dt characteristics of the device is discussed, followed by a description of the present fabrication process. Electrical operating test data on laboratory devices are presented, and the specialized test equipment is described. (Author)

AD-619 050 Div. 8/2
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., Auburn, N. Y. Semiconductor Products Dept.
THE DEVELOPMENT AND EVALUATION OF A BILATERAL TRIODE SWITCH.
Quarterly progress rept. no. 5, 13 Apr-13 Jul 65.
13 Jul 65, 37p
Contract NObsr91151, Proj. SR00 80304, Task 9348
Unclassified report

See also AD-603 560.

Descriptors: (*Electronic switches, Triodes), (*Triodes, Electronic switches), (*Semiconductor devices, Triodes), Design, Processing, Silicon, Gates(Circuits).

The report describes the work performed toward the development of an improved bilateral triode p-n-p-n switch. Device assembly methods are discussed, and the reasoning is given leading to the present design. Several important features of the advance final design are presented, especially those bearing on the dynamic properties of the device. Photoresist techniques as employed on this device are discussed. (Author)

AD-619 059 Div. 8/2, 8/7
CFSTI Prices: HC$1.00 MF$0.50

Chalmers Univ. of Technology, Goteborg (Sweden). Research Lab. of Electronics.
ANOMALOUS NOISE PEAK IN ADLER TUBES.
Research rept.,
by Olle Nilsson. 1965, 17p
Rept. no. RR-51
Contract AF61 052 594
RADC TR-65-322
Unclassified report

Descriptors: (*Parametric amplifiers, Noise(Radio)), (*Noise(Radio), Parametric amplifiers), Electron tubes, Electron beams, Cyclotron waves.

An experimental investigation of the noise stripping mechanism in two Adler tubes with high residual gas pressure (>0.000001 mm Hg) has revealed the presence of an anomalous noise peak (> 1 000 K). The peak occurs at a frequency somewhat lower than the cyclotron frequency. It is proposed that the peak is produced by elastically scattered beam electrons traveling slowly through the input coupler. The phenomenon is described in terms of an idealized theory which is in good agreement with the experimental findings. (Author)

AD-619 066 Div. 8/2, 25/6, 23/5
CFSTI Prices: HC$4.00 MF$0.75

Westinghouse Electric Corp., Elmira, N. Y. Electronic Tube Div.
SOLID STATE IMAGE INTENSIFIERS. PHASE III. A BROAD CONTINUING PROGRAM FOR THE APPLICATION OF LIGHT AND IMAGE INTENSIFICATION TECHNIQUES TO MILITARY TRAINING.
Annual rept., phase 3, 26 Jun 63-26 Jun 64,
by D. C. Fowlis, R. D. Harder, R. E. W. Lake, Z. Szepesi, and W. A. Thornton. Mar 65, 102p
Contract N61339 1440
NAVTRADEVCEN 1440-1
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
Copy is available for public sale.
See also AD-431 545.

Descriptors: (*Image intensifiers(Electronics), Semiconductor devices), (*Semiconductor devices, Image intensifiers(Electronics)), (*Military training, Image intensifiers(Electronics)), Photoelectric materials, Sandwich construction, Electroluminescence, Powders, Films, Cadmium compounds, Zinc compounds, Sulfides, Selenides, Resolution, Brightness.

The objectives of the program were: (1) to improve the characteristics of the low resolution (40 lines/inch) photoconductive-electroluminescent (PC-EL) type image intensifier panel; (2) to construct a high resolution (1000 lines/inch) PC-EL type image intensifier; (3) to build an experimental model compact optical projection system, incorporating the image intensifier panel. Panels with the best uniformity, least graininess and widest half-tone range reproducing capability had maximum standard luminous gains (measured with a 2870K tungsten light source) of 20 foot-Lambert per foot-candle and maximum output brightnesses of 30 foot-Lamberts at 200 volts and 2000 cps. Response times between 50 and 500 mseconds were measured. Work is being continued toward improving the speed, spectral response, gain, and life characteristics of PC layers, developing the high resolution image intensifier panel, and building a compact optical projection system with the improved image intensifier panels. (Author)

AD-619 080 Div. 8/2
CFSTI Prices: HC$4.00 MF$1.00

Shockley Transistor Div., Clevite Transistor, Palo Alto, Calif.
NEW CONCEPTS FOR SOLID STATE MICROWAVE GENERATORS.
Final rept. for 1 Oct 62-28 Feb 65,
by R. M. Scarlett and M. A. Medina. May 65, 127p
Contract DA36 039AMC00001E, Proj. 1P6 22001A056
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
Copy is available for public sale.
See also AD-614 000.

Descriptors: (*Microwave equipment, Semiconductor devices), (*Semiconductor devices, Microwave equipment), (*Radiofrequency generators, Semiconductor devices), Diodes(Semiconductor), Transistors, Epitaxial growth, Silicon, Attenuation, Microwave amplifiers, Harmonic oscillators, Semiconducting films, Capacitors.

The basic theory of transit-time delay diodes is developed, and their maximum power output calculated. This output is about 7% of that calculated for conventional transistors on a similar basis, but the maximum operating frequency should be higher by a factor of order five. PIN charge storage diodes made by epitaxy have transition times corresponding to theory. A theoretical treatment of transient forward and reverse charge storage is applied to harmonic generator calculations. It appears that PIN diodes may be superior to conventional varactors up to several Gc. Preliminary experimental results are encouraging. The first-order theory of a new amplifying device principle, termed the Surface Controlled Avalanche Transistor, is presented. This device appears promising as a microwave amplifier up to several Gc for relatively high power. Initial experimental devices performed approximately as expected, showing no decrease in transconductance up to 1 Gc. Measurements of acoustic attenuation and velocity in P-type silicon were performed using a pulse technique with quartz transducers bonded to the ends of a rectangular rod sample. A frequency range of 608-960 Mc was used, and the results were approximately as expected. (Author)

AD-619 081 Div. 8/2, 26/3
CFSTI Prices: HC$1.00 MF$0.50

General Instrument Corp., Darlington, S. C. Capacitor Div.
PRODUCTION ENGINEERING MEASURE FOR THE IMPROVED RELIABILITY OF CAPACITORS, FIXED, SOLID ELECTROLYTE, TANTALUM HIGH-RELIABILITY 100 MFD-20 VOLT CAPACITORS.
Quarterly rept. no. 7, 29 Dec 64-28 Mar 65,

by Floyd R. Banks, Jr. and A. Di Giacomo. 28 Mar 65, 25p
Contract DA36 039AMC03622E
Unclassified report

See also AD-614 989.

Descriptors: (*Tantalum capacitors, Manufacturing methods), Fixed capacitors, Binders, Processing, Sintering, Reliability(Electronics), Aging(Materials), Anodes, Pyrolysis, Coatings, Carbon, Silver, Quality control, Life expectancy, Performance(Engineering).

A concise statement is presented of the work performed. Actions III and IV were taken on our Technical Action Request Number 3 from which changes in the Contract were approved; in these changes the 100 MFD-20 Volt capacitor becomes the major rating under the Contract, and eight additional ratings are included in the Program. Four of the basic changes in the Contract are presented in Section 7, including the capacitor ratings and quantities required. Process improvement studies were conducted primarily on the 100 MFD-20 Volt capacitor; some of these studies were applied to the 33 MFD-35 Volt capacitor rating. The areas of process improvement studies were: (a) tantalum powder control and anode design; (b) binder control; (c) sintering; (d) anodizing and re-forming; and (e) ageing and screening. (Author)

AD-619 083 Div. 8/2, 25/6
CFSTI Prices: HC$3.00 MF$0.75

Western Electric Co., Inc., New York.
ENGINEERING SERVICES ON TRANSISTORS.
Quarterly progress rept. no. 8, 1 Jan-31 Mar 65,
by S. R. Arnold, H. J. Boll, C. R. Crowell, J. E. Iwersen, and B. T. Murphy. 30 Jun 65, 93p
Rept. no. 20
Contract DA36 039AMC02227E, Proj. 1P6 22001A056
Unclassified report

Prepared in cooperation with Bell Telephone Labs., Inc., New York. Continuation of Contract DA36 039SC90759. See also AD-615 584.

Descriptors: (*Transistors, Germanium), (*Integrated circuits, Transistors), Microwave equipment, Copper alloys, Germanium alloys, Semiconducting films, Titanium alloys, Aluminum alloys, Chromium alloys, Gain, Current limiters, Computer logic, Gates(Circuits), Hysteresis, Noise(Radio), X band.

A low-resistance ohmic base contact for a planar germanium transistor is essential if maximum microwave performance of the device is to be achieved. A base contact employing a copper-germanium intermetallic layer, followed by titanium-aluminum or chromium-aluminum metallization has been shown to have satisfactory properties for the devices under current development. Devices using this contact have shown improved performance in the 1-to 6-Gc range. Results of a new simplified method of determining unilateral gain (U) from quantities that are relatively easily measured agree well with those obtained by other methods. Current limiters based on the high-field saturation of electron-drift velocity in germanium were fabricated by diffusing 10-micron-square n(+) contacts, 2 microns apart, into a 0.5-micron-deep Sb-diffused layer having a surface concentration of about 10 to the 17th power/cu cm. Limiting current was about 2.5 ma between 2 and 16 volts; the conductance in the limiting range was approximately 0.00004 mho, and contact-to-contact capacitance was 0.1 pf. It has been shown that is is possible to design fast, nonsaturating logic circuits that are stable against spurious oscillation.

AD-619 085 Div. 8/2, 25/6
CFSTI Prices: HC$1.00 MF$0.50

Airborne Instruments Lab., Inc., Deer Park, N. Y.
FREQUENCY MULTIPLIER.
Quarterly rept. no. 2, 1 Mar-31 May 65,
by G. P. Kurpis and J. J. Taub. 31 May 65, 24p
Contract DA28 043AMC00438E, Proj. 1P6 22001A058
Unclassified report

See also AD-616 635.

Descriptors: (*Frequency multipliers, Semiconductor devices), (*Semiconductor devices, Frequency multipliers), Extremely high frequency, Varactor diodes, Diodes-(Semiconductor), Impedance matching, Gallium alloys, Arsenic alloys, Coaxial filters, Cavity resonators, Waveguides.

The primary emphasis was placed on designing a 50 to 100 Gc doubler and a 1.04 Gc x8 step recovery diode multiplier. Since the newly designed cross-guide 50 to 100 Gc doubler model was not completed, the special Varad varactor had been used in another modified in-line doubler mount. Small doubler output near 100 Gc was obtained during the preliminary tests of this unit. The step recovery diode multiplier was constructed and tested during this quarter, but it did not perform well as a result of spontaneous parametric oscillations and other circuit problems. (Author)

AD-619 088 Div. 8/4, 8/7
CFSTI Prices: HC$1.00 MF$0.50

Litton Systems, Inc., San Carlos, Calif. Electron Tube Div.
RESEARCH ON NOISE IN CROSSED-FIELD GUNS.
Quarterly rept. no. 8, 1 Apr-30 Jun 65,
by R. P. Wadhwa. 11 Aug 65, 10p
Contract NObsr89546
Unclassified report

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Descriptors: (*Electron guns, Noise(Radio)), (*Crossed field devices, Electron guns), Standing wave ratios, Amplifiers, Performance(Engineering).

Noise-figure versus frequency characteristics and correlation of other data in the previous hot testing indicated the necessity of improving VSWR characteristics. The tube was opened and window assemblies were modified; along with this the uniformity of spacing between the vanes resulted in improved VSWR characteristics. During the hot testing period a partial leak developed between the heater and the cathode; this prevented us from obtaining low-noise results. Output characteristics indicated a strong 60 c/s component resulting in large values of noise figure. Tube was opened again and a completely new gun assembly was installed in the tube. The various data obtained during this period and from the hot testing of the tube will be presented in the final report, which is now being completed. (Author)

AD-619 102 Div. 8/2, 26/1
CFSTI Prices: HC$1.00 MF$0.50

Valpey Fisher Corp., Holliston, Mass.
QUARTZ CRYSTAL UNIT CR-(XM-37)/U.
Quarterly progress rept. no. 11, 1 Jan-31 Mar 65,
by Norman R. Gillin. 31 Mar 65, 23p
Contract DA36 039SC85972 Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.
See also AD-616 256.

Descriptors: (*Quartz resonators, Manufacturing methods), Quality control, Processing, Crystal holders, Crystals, Precision finishing, Farture(Mechanics), Tolerances-(Mechanics), Performance(Human), Operators(Personnel).

The finishing operation has shown up as the weak link of the Pilot Run. Not all operators have shown capability in handling mounted units at these frequencies. Breakage at times has reached 25%. Experience and selection of finishers seems at present to be the best solution. The best finishers are able to set on frequency to specified tolerance with little difficulty.

AD-619 103 Div. 8/2, 26/1
CFSTI Prices: HC$2.00 MF$0.50

Piezo Crystal Co., Carlisle, Pa.
PEM QUARTZ CRYSTAL UNITS, FILTER LOW FREQUENCY, 1 MC TO 10 MC TYPES CR-(XM-49)/U THRU CR-(XM-52)/U PER SCS-191 DATED 23 JANUARY 1963.
Quarterly progress rept. no. 3, Jan-Mar 65, by A. S. Matistic. 8 Jun 65, 28p
Contract DA36 039AMC03635E

Unclassified report

See also AD-609 463.

Descriptors: (*Crystal filters, Manufacturing methods), (*Quartz, Crystal filters), High frequency, Medium frequency, Crystal holders, Crystals, Processing.

The planoconvex design was employed in the Piezo approach to elimination or suppression of unwanted modes, 40db or more, in the region of nominal frequency ±5% on 4 Engineering Sample frequencies: 1.75 mc, 5 mc, 6 mc and 7.5 mc. For the remaining 10 mc frequency, a flat-plate design was employed. A flat-plate design, incorporating a mass loading technique, was introduced at 7.5 mc. Results of this work are also included. Because of encouraging results which were obtained with the mass loading approach at 7.5 mc, the technique has been extended to encompass the 5 mc and 6 mc frequencies, for a total of 4 out of 5 frequencies in the fabrication of the 3rd set of engineering samples.

AD-619 108 Div. 8/3

California Univ., Berkeley. Dept. of Electrical Engineering.
ON THE ABSOLUTE STABILITY OF NONLINEAR SAMPLED-DATA SYSTEMS,
by E. I. Jury and B. W. Lee. 10 Jul 64, 6p
Grant AF AFOSR292 63, Proj. 9749, Task 974901
AFOSR 65-1011

Unclassified report

Research done in cooperation with Noller Control Systems, Inc., Richmond, Calif.
Pub. in IEEE Transactions on Automatic Control vAC-9 n4 p551-4 Oct 1964 (Copies not available to DDC or Clearinghouse customers).
Revision of manuscript submitted 28 Feb 64.

Descriptors: (*Stability, Nonlinear systems), Frequency, Control systems, Inequalities, Data, Computers.

A general form of area inequality is used to develop a frequency domain criterion for absolute stability of single-nonlinear sampled-data (SNSD) systems. By reductions of the general form to specific area inequalities, it is suggested that all known and some new frequency domain criteria applicable to different subclasses of SNSD systems may be derived as special cases. One of the latter involving q<0 is investigated to determine its significance and general applicability to SNSD systems. An example of a SNSD system with dead zone is used to illustrate some of the results presented. (Author)

AD-619 143 Div. 8/2, 25/6
CFSTI Prices: HC$2.00 MF$0.50

Sprague Electric Co., North Adams, Mass.
FEASIBILITY STUDY OF METAL BASE TRANSISTOR.
Quarterly rept. no. 1, phase 2, 20 Jan-30 Apr 65, by J. J. Casey, F. L. Vogel, and P. M. Kennedy.
30 Apr 65, 28p Rept. no. 2
Contract DA28 043AMC00168E, Proj. 1P622001A056, Task 04

Unclassified report

Descriptors: (*Transistors, Metal films), Microwave equipment, Molybdenum, Silicon, Semiconductors, Sandwich construction, Vapor plating, Phase studies, Surface properties, Penetration, High-temperature research, Molybdenum alloys, Silicon alloys, Electron diffraction analysis, Electron microscopy.

The molybdenum-silicon phases produced by chemical vapor deposition of molybdenum on (111) Si substrates have been investigated by electron diffraction, microwave absorption, and electron microscopy. Details of some of these phases have been determined, and important differences in the resistances of (100) Si and (111) Si surfaces to molybdenum penetration have been noted. In at least one case, a layer deposited at 700C has retained its metallic character after being heated to 1200C. (Author)

AD-619 144 Div. 30/2, 32/3, 18/2
CFSTI Prices: HC$6.00 MF$1.25

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
APPLIED RESEARCH PROGRAM AEROSPACE INTELLIGENCE DATA SYSTEM (AIDS); VOLUME III, APPENDIX.
Final rept. vol-3, app. for 25 May 61-15 Nov 63.
15 May 64, 222p
Contract AF19 626 10

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale. See also AD-619 149.

Descriptors: (*Data processing systems, Operations research), (*Information retrieval, Programming-(Computers)), Control systems, Astronautics, Military intelligence, Instruction manuals, Programming languages, Statistical analysis.

The STatistically ORiented Matrix program, STORM, was written for statisticians at all levels who need a variety of mathematical and statistical computations made in a minimum of time and with little programming preparation. Only a knowledge of what computational routines are available and how they are requested by simple control cards is necessary to obtain meaningful results from this large, flexible computer system. STORM consists of two sections, the executive program which exercises supervisory control over the system, and the computational subroutines which perform the Basic Operations.

AD-619 145 Div. 30/2, 32/3, 18/2
CFSTI Prices: HC$6.00 MF$1.25

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
APPLIED RESEARCH PROGRAM AEROSPACE INTELLIGENCE DATA SYSTEM (AIDS), VOLUME IV, APPENDIX.
Final rept. vol. 4, app. for 25 May 61-15 Nov 63.
15 May 64, 234p
Contract AF19 626 10

Unclassified report

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See also AD-619 149.

Descriptors: (*Data processing systems, Operations research), (*Information retrieval, Programming-(Computers)), Programming languages, Astronautics, Military intelligence, Statistical distributions, Data storage systems, Statistical analysis, Operation.

Contents:
Program documentation of basic operations
Statistical distribution programs for a computer language.

AD-619 146 Div. 30/2, 32/3, 18/2
CFSTI Prices: HC$5.00 MF$1.00

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
APPLIED RESEARCH PROGRAM AEROSPACE INTELLIGENCE DATA SYSTEM (AIDS), VOLUME I, APPENDIX.
Final rept. vol. 1, app. for 25 May 61-15 Nov 63.
15 May 64, 154p
Contract AF19 626 10

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.
See also AD-619 149.

Descriptors: (*Data processing systems, Operations research), (*Information retrieval, Search theory), Data storage systems, Language, Probability, Programming(Computers), Documentation, Astronautics, Vocabulary, Military intelligence.

Contents:
Listing of query program
Constructing an 'adaptive' thesaurus by man-machine interaction
Description of English text retrieval programs for AN/GYA Console Application
Toward document retrieval theory; Relevance-recall ratio for texts containing one specified query term.

AD-619 147 Div. 30/2, 32/3, 18/2
CFSTI Prices: HC$5.00 MF$1.25

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
APPLIED RESEARCH PROGRAM AEROSPACE INTELLIGENCE DATA SYSTEM (AIDS), VOLUME II, APPENDIX.
Final rept. vol 2, app. for 25 May 61-15 Nov 63.
15 May 64, 186p
Contract AF19 626 10

Unclassified report

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See also AD-619 149.

Descriptors: (*Data processing systems, Operating research), (*Information retrieval, Special purpose computers), Multiple operation, Military intelligence, Astronautics, Statistical analysis, Programming-(Computers), Programming languages.

Contents:
Listing of Multiprocessing Monitor for AN/GYA
Listing of Statistical Executive Routine for AN/GYA.

AD-619 148 Div. 30/2, 32/3, 18/2
CFSTI Prices: HC$4.00 MF$0.75

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
APPLIED RESEARCH PROGRAM AEROSPACE INTELLIGENCE DATA SYSTEM (AIDS), VOLUME V, APPENDIX.
Final rept. vol 5, app. for 25 May 61-15 Nov 63.
15 May 64, 103p
Contract AF19 626 10

Unclassified report

Descriptors: (*Data processing systems, Operations research), (*Information retrieval, Programming-(Computers)), Matrix algebra, Cathode ray tubes, Statistical analysis, Functions, Military intelligence, Astronautics, Analysis of variance.

Contents:
A generalized discriminant function (theory and example)
Edit display - a description of cathode ray tube editing program.

AD-619 149 Div. 30/2, 32/3, 18/2
CFSTI Prices: HC$4.00 MF$1.00

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
APPLIED RESEARCH PROGRAM AEROSPACE INTELLIGENCE DATA SYSTEM (AIDS).
Final rept. for 25 May 61-15 Nov 63.
15 May 64, 105p
Contract AF19 626 10

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Data processing systems, Operations research), (*Information retrieval, Special purpose computers), Data transmission systems, Data storage systems, Classification, Optimization, Programming-(Computers), Input-output devices, Programming languages, Typewriters, Computer personnel, Compilers, Statistical analysis, Statistical distributions, Probability, Multiple operation, Astronautics, Military intelligence.

The report contains description of work performed on optimum search criteria for formatted data; transformation of unformatted textual information into standard form; multiple interrogation; compiler for statistical mathematics; statistical prediction and classification techniques; and computer data input edit consoles. The main part is followed by five appendix volumes (AD-619 144 through AD-619 148) containing technical reports and program documentation. (Author)

AD-619 151 Div. 8/3
CFSTI Prices: HC$1.00 MF$0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
ATMOSPHERIC DISPERSION OF A WIDE BANDWIDTH RADAR SIGNAL DESIGNED FOR PULSE COMPRESSION.
Technical note,
by Sidney L. Borison. 9 Jul 65, 20p
Rept. no. TN-1965-27
Contract AF19 628 5167, ARPA Order 498
ESD TDR-65-307
Unclassified report

Descriptors: (*Radar signals, Atmospherics), (*Atmospherics, Radar signals), (*Pulse compression, Radar signals), Broadband, Attenuation, Dielectric properties, Refractive index, Atmosphere.

Dispersion of a wide-bandwidth radar signal by a static atmosphere is considered. Using experimental data to fit the attenuation (in db/km) due to molecular resonances, the index of refraction may be inferred. The dispersive delay due to two-way propagation through the atmosphere is then compared to the dispersion one would normally design for a pulse compression receiver. Comparison indicates that atmospheric dispersion is quite small unless the center frequency is near the lowest water vapor resonance at lambda = 1.35 cm. (Author)

AD-619 154 Div. 8/2, 26/4
CFSTI Prices: HC$1.00 MF$0.50

Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Norwood, Mass.
PRODUCTION ENGINEERING MEASURE FOR CAPACITORS, FEED-THROUGH, SOLID ELECTROLYTE TANTALUM PELLET.
Quarterly rept. no. 5, 1 Apr-30Jun 65,
by W. G. Bailey. 30 Jun 65, 21p
Contract DA36 039AMC03630E
Unclassified report

See also AD-615 344.

Descriptors: (*Tantalum capacitors, Manufacturing methods), Aging(Materials), Life expectancy, Electrolytic capacitors, Electrical impedance.

The additional failures on the restarted life test pointed out the necessity of manufacturing a new lot of preproduction samples incorporating process changes and improvements in order to provide units to meet the revised life test circuit impedance requirement which is many times more severe a test than the original SCL-6423 specification requirement. Since testing has not started, no definite conclusions can be drawn on the results of the process changes or the new sample lot. However, the very minimum of process and aging losses to the end of this quarter indicate that the new sample lot will run at a better yield than previous lots, even with the prolonged low impedance aging cycle. (Author)

AD-619 161 Div. 8/4
CFSTI Prices: HC$3.00 MF$0.75

Raytheon Co., Waltham, Mass. Microwave and Power Tube Div.
RESEARCH AND DEVELOPMENT OF A V-BAND 3.2 MILLIMETER MAGNETRON.
Final rept. for 15 Aug 64-15 Feb 65,
by R. Plumridge. 15 Feb 65, 71p Rept. nos. PT-913; 2
Contract DA28 043AMC00229E, Proj. 1P6 22001A055 04
Unclassified report

Descriptors: (*Magnetrons, V Band), (*Microwave oscillators, V Band), (*Electron tube parts, Design), Anodes(Electron tubes), X Band, Cavity resonators, Waveguide windows, Magnetic fields, Circuits, Cathodes-(Electron tubes), Electron tube heaters, Attenuation, Cyclotron waves.

The report describes the work performed to develop an inverted coaxial V-band cavity-stabilized magnetron. The study included the development and cold testing of X- and V-band models of the anode, and the design and testing of critical components of the tube such as the heater cathode assembly and the mode damper. A 9-scaled X-band cold test model of the anode, cavity and output was made and extensively investigated. The fast cyclotron mode interference problem was explored. A satisfactory V-band anode was made with E.D.M. techniques. A good unloaded Q was measured with the V-band anode and a satisfactory match was obtained with a half wave ceramic window. A practical magnetic circuit was worked out to provide high magnetic field. An investigation of carburized ceramic dampers was made and, although a satisfactory damper was not developed during this period, the design of a good damper does not appear to be a difficult problem. A model of the heater cathode assembly was constructed for bell jar test and was life tested for a period of 1040 hours. (Author)

AD-619 175 Div. 8/2, 15/1
CFSTI Prices: HC$1.00 MF$0.50

New York State Univ., Stony Brook. Coll. of Engineering.
APPLICATION OF GENERALIZED FUNCTION THEORY TO NETWORK REALIZABILITY THEORY AND TIME DOMAIN SYNTHESIS OF POSITIVE-REAL FUNCTIONS.
Final rept. for 1 Jun 63-31 May 65,
by A. H. Zemanian. 31 May 65, 13p Rept. no. 41
Contract AF19 628 2981, Proj. 5628, Task 562806
AFCRL 65-316
Unclassified report

Descriptors: (*Networks, Functional analysis), (*Functions, Networks), Distribution theory, Matrix algebra, Fourier analysis, Integral transforms, Synthesis, Time.

Work performed during the period from June 1, 1963 to May 31, 1965 is summarized. All significant results have previously been reported in scientific reports and journal publications. The present report summarizes and compares these results. (Author)

AD-619 223 Div. 8/3
CFSTI Prices: HC$3.00 MF$0.75

Electronic Systems Lab., Mass. Inst. of Tech., Cambridge.
BASIC CONTROL THEORY. SENSITIVITY OF OPTIMAL CONTROL SOLUTIONS.
Final technical rept.,
by G. C. Newton. Mar 65, 62p
Rept. no. ESL-FR-239
Grant DA ARO D31 124G193, Proj. DSR8942
Unclassified report

Descriptors: (*Optimization, Control systems), Control, Theory, Sensitivity, Perturbation theory, Calculus of variations.

AD-619 258 Div. 7/3, 8/2, 26/4
CFSTI Prices: HC$3.00 MF$0.75

General Electric Co., Auburn, N. Y. Semiconductor Products Dept.
A PRODUCTION ENGINEERING MEASURE FOR THE

IMPROVEMENT OF PRODUCTION TECHNIQUES TO INCREASE THE RELIABILITY AND TO IMPROVE PRODUCT CAPABILITY OF HIGH VOLTAGE MINIATURE SILICON RECTIFIERS TYPE 1N4249.
Quarterly progress rept. no. 1, 30 Dec 64-31 Mar 65,
by W. R. Comstock, N. E. Devolder, R. R. Schall and E. G. Tefft. 31 Mar 65, 86p
Contract DA36 039AMC06157E
Unclassified report

Descriptors: (*Rectifiers, Manufacturing methods), (*Silicon, Rectifiers), (*Diodes(Semiconductor), Silicon), Reliability(Electronics), Specifications, Pellets, Glass, Casting, Encapsulation, Voltage, Miniature electronic equipment.

The report covers the work performed on the pellet design, reliability test equipment, the glass casting process and the rating requirements of leaded rectifiers.

AD-619 274 Div. 8/4
CFSTI Prices: HC$3.00 MF$0.75

Microwave Electronics Corp., Palo Alto, Calif.
DEVELOPMENT OF TWO X-BAND VARIABLE GAIN TWTs (ONE LOW LEVEL AND ONE MEDIUM LEVEL).
Interim development rept. no. 3, 1 Jan-31 Mar 65,
by Norman Berger, G. A. Foggiato, and J. Gaenzle.
Jul 65, 83p
Contract NObsr91341, Proj. SF0100201, Task 9294
Unclassified report

See also AD-611 213.

Descriptors: (*Traveling-wave tubes, X band), Gain, Noise(Radio), Radiofrequency power, Helixes, Performance(Engineering).

Four tubes were fabricated and tested for small-signal gain, noise figure and power output during this reporting period. The large gap between performance obtained and that specified emphasizes the need for a more analytical approach to the problem. Theoretical analysis has been made of the effect of helix dispersion on attaining flat, wide-range (30 db) gain control. The cases of positive and negative dispersion are presented to derive the relative merit of tubes fabricated with helices with these dispersions. An analysis of output power versus center-helix voltage (three-helix TWT) has been made and correlation of data from a fabricated tube is attempted. Of special interest is the output-helix gain required to maintain constant power output and different gain levels. A short analysis of noise figure is made but further study must be pursued in this direction. (Author)

AD-619 295 Div. 8/2, 26/4
CFSTI Prices: HC$3.00 MF$0.50

Motorola, Inc., Phoenix, Ariz. Semiconductor Products Div.
PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS.
Quarterly progress rept. no. 1, 1 Jan-31 Mar 65,
by Thomas Kearkuff. 31 Mar 65, 52p
Contract DA36 039AMC06156E, Proj. 74001
Unclassified report

Descriptors: (*Transistors, Manufacturing methods), (*Silicon, Transistors), Diffusion, Gold, Chemical milling, Precision finishing, Processing, Encapsulation, Bonding, Glass, Wire, Storage, Epetixial growth, Relibility(Electronics).

New base predeposition and base diffusion systems were put into production and evaluated. Work was started on a new emitter and gold diffusion process. Work was started on the emitter stripe width evaluation. Chemical etching was placed into production and work on slurry polishing is almost complete. A new photoresist was evaluated and production controls are presently being applied. New assembly parts and processes were evaluated from the assembly viewpoint. (Author)

AD-619 363 Div. 8/7, 8/2, 16/1

Electronic Systems Lab., Mass. Inst. of Tech., Cambridge.
THE DESIGN OF NONLINEAR FILTERS AND CONTROL SYSTEMS. PART II,
by Jacob Katzenelson and Leonard A. Gould. 1964, 29p
Grant DA ARO D31 124G193
AROD 3365:4
Unclassified report

Pub. in Information and Control v7 n2 p117-45 Jun 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Filters(Electromagnetic wave), Design), (*Control systems, Design), (*Eye, Mathematical models), Nonlinear systems, Servomechanisms, Statistical functions, Iterative methods.

The applicability of the theoretical method developed in Part I to analytical and experimental examples is explored. It is shown that the method has limited utility in analytically interesting examples but that, through judicious use of modern computation machinery, numerical solutions to real, physical problems appear to be feasible-but difficult and involved. An experimental application of the theory to the characterization of the servomechanism associated with the pupil of the human eye is described. Emphasis is placed on the utilization of known properties of the experimental system in planning the computation. A measure of the complexity of the computation is developed in order that the practicability of applying the method in a given situation may be judged in advance. (Author)

AD-619 370 Div. 8/4, 25/3
CFSTI Prices: HC$1.00 MF$0.50

Army Electronics Command, Fort Monmouth, N. J.
HIGH-DENSITY PLASMAS.
Status rept.,
by John E. Creedon. Jul 65, 17p
Rept. no. ECOM-2603
Proj. 1P6 22001A055, Task 1P6 22001A055 02
Unclassified report

Descriptors: (*Electron tubes, Plasma physics), (*Electronic switches, Plasma medium), (*Plasma medium, Resistance(Electrical), Electric currents, Hydrogen, Deuterium, Nitrogen.

The resistivity of high-density plasmas for use in high-current switches is being studied. This report concerns the plasma drop and its dependence on current. Data obtained from tests conducted on two diodes at peak current ranges from approximately 12,500 to 75,000 amperes at hydrogen gas pressures of 0.5, 1.0, and 5.0 millimeters are discussed. (Author)

AD-619 375 Div. 8/2, 26/1
CFSTI Prices: HC$2.00 MF$0.50

TRW Semiconductors, Inc., Lawndale, Calif.
PRODUCTION ENGINEERING MEASURE RELIABILITY THROUGH PROCESS IMPROVEMENT (EXTENSION TO

2N2525 TRANSISTOR FAMILY).
Quarterly rept. no. 3, 1 Dec 64-28 Feb 65,
by G. Erkan and G. Onodera. 28 Feb 65, 35p
Contract DA36 039SC86742E

Unclassified report

See also AD-613 687.

Descriptors: (*Transistors, Manufacturing methods), Reliability(Electronics), Packaging, Ceramic materials, Beryllium compounds, Oxides, Silver, Brazing, Environmental tests, Hermetric seals, Failure-(Mechanics), Silicon.

Investigation of the silicon die attachment using x-rays, step stress and cross-sectioning showed that under standard mounting conditions reliable mounts could be easily produced. Package design was finalized, based on the analytical studies given in the previous quarterly report and experiments performed in this quarter. Use of the flange and package cap as a hot emitter terminal showed no enhancement in the RF response of the package. This aspect of the package design has been dropped. The final conclusion of the investigation into high strength, reproducible ceramic metallizing mixtures was that the standard moly-manganese gave the most reliable results. Pure silver was the final selection for the pin braze material. (Author)

AD-619 386 Div. 30/2, 15/1, 16/4
CFSTI Prices: HC$3.00 MF$0.75

Carnegie Inst. of Tech., Pittsburgh, Pa.
AN EXAMPLE OF HUMAN CHESS PLAY IN THE LIGHT OF CHESS PLAYING PROGRAMS,
by Allen Newell and Herbert A. Simon. Aug 64, 91p
Contract SD146; Grant NIH MH07722 01

Unclassified report

Descriptors: (*Game theory, Decision making), (*Programming(Computers), Game theory), Cybernetics, Search theory, Simulation, Reasoning, Artificial intelligence, Bionics.

This paper is concerned with the use of chess programs to study human thinking. The work on chess programs has produced a collection of mechanisms sufficient to play chess of modest caliber. Independently of their detailed characteristics, they help understand what must be done in order to play chess. The approach used was to examine in some detail the behavior of a man deciding what move to make in a specific middle game position. Having available a protocol, a transcript of the verbal behavior of the man while he is analysing the board and making his decision. Previous work with protocols in other tasks (proving theorems, guessing sequences, learning concepts) has aimed at constructing computer programs that match the behavior in detail. In this paper the authors undertake only the first stages of such an analysis, laying bare the reasoning the subject employed, by examining his protocol in detail. The analysis draws upon ones general knowledge about reasoning mechanisms and how to organize information processing.

AD-619 387 Div. 8/2, 20/3, 12/1
CFSTI Prices: HC$2.00 MF$0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
ANALYSIS OF RADIATION EFFECTS IN TELEMETRY CIRCUITS.
Technical note,
by A. G. Stanley. 21 Jul 65, 31p Rept. no. 1965-20
Contract AF19 628 5167
ESD TDR-65-310

Unclassified report

Descriptors: (*Telemeter systems, Radiation damage), (*Radiation damage, Telemeter systems), (*Switching circuits, Telemeter systems), Lunar craft, Space flight, Space environmental conditions, Simulation, Relaxation oscillators, Silicon, Transistors.

The effects of nuclear radiation on the telemetry circuits in the LES satellites have been analysed by direct irradiation and by simulating the effects on individual components on a breadboarded circuit. The simulation method is described in detail. It requires a precise knowledge of the behavior of each component operating under specified bias conditions in a radiation environment, but may be applied to circuits of considerable complexity. The analysis confirmed that circuits such as the flip-flop, which operate at 50 per cent duty cycle, are insensitive to moderate leakage currents and have low gain requirements, are extremely radiation resistant. The converse holds for circuits that operate at low duty cycles, that are sensitive to leakage currents and that have more stringent gain requirements. (Author)

10. Energy Conversion (Non-propulsive)

AD-618 923 Div. 7/6, 7/5, 14/2, 25/8
CFSTI Prices: HC$4.00 MF$1.00

Radio Corp. of America, Lancaster, Pa. Electronic Components and Devices.
RESEARCH STUDIES ON THERMIONIC CONVERTERS, EMITTER SHELL PHASE.
Rept. no. 5 (Final) for 1 Jul 63-28 Feb 65,
by G. Y. Eastman. Mar 65, 134p
Contract DA36 039AMC03197E
Task 1G6 22001A 055 02
Unclassified report

See also AD-611 403.

Descriptors: (*Thermionic converters, Heaters), (*Ceramic materials, Thermionic converters), Aluminum compounds, Oxides, Beryllium compounds, Silicon compounds, Carbides, Permeability, Corrosion, Combustion products, Structural shells, Shock resistance, Thermal stresses, Life expectancy, Refractory materials.

The objective of the program was the development of a barrier shell to protect thermionic energy converters from the combustion products of a fossil fuel flame. Two material properties are of prime importance; impermeability, and corrosion resistance. Three types of materials were selected for extensive testing; alumina, beryllia and silicon carbide. Equipment of very high sensitivity (10) to the minus 12th power liter torr/sq cm second) was developed which permitted the determination of gas permeation rates. The identification of individual gases was made possible by the latest mass spectrometer equipment. It was determined that high purity alumina has the lowest permeation rate, the highest material strength, good thermal shock resistance and is resistant to corrosion. Beryllium oxide had a poor corrosion resistance and a high permeation rate for carbon monoxide. The pyrolytic silicon carbide samples obtained for this program evidenced high permeation rates for carbon monoxide and showed a tendency toward unpredictable fracture after extended periods at elevated temperatures. (Author)

AD-619 379 Div. 7/6, 7/5, 20/7
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., Pleasanton, Calif. Special Purpose Nuclear Systems Operation.
RESEARCH AND DEVELOPMENT OF THERMIONIC CONVERSION OF HEAT TO ELECTRICITY.
Quarterly letter rept. no. 4, 30 Mar 64-29 Jun 65.. 29 Jun 65, 7p
Contract NObs90496, Proj. SR007 12 01; ARPA Order 219
Unclassified report

See also AD-455 806.

Descriptors: (*Energy conversion, Thermionic converters), (*Thermionic converters, Electric power production), (*Nuclear power plants, Energy conversion), Reactor fuels, Uranium compounds, Oxides, Uranium, Diffusion, Tungsten, Molybdenum, Reactor fuel cladding, Oxygen, Aluminum compounds, Niobium, Reaction kinetics, Seals(Stoppers), Cermets, Bonding, Welds, Ceramic materials, Life expectancy.

Progress is reported on the development of a nuclear thermionic electrical generating system for the Department of the Navy. Work is being performed to develop the materials capabilities which are essential for this nuclear thermionic system. This work consists of three major tasks. They are: UO2 - refractory metal reaction kinetics, insulator materials development, ceramic-to-metal seal development.

11. Materials

AD-618 815 Div. 14/6

National Research Council of Canada, Ottawa (Ontario). Div. of Building Research.
EFFECT OF WEATHERING ON THE INCREASE IN HARDNESS OF ASPHALTS.
Research paper,
by P. M. Jones. Jan 65, 7p
Rept. nos. RP-253; NRC-8522
Unclassified report

Presented at the Meeting of the American Chemical Society (147th), Philadelphia, Pa., Apr 64. Pub. in I and E C Product Research and Development v4 n1 p57-60 Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Asphalt, Aging(Materials)), (*Hardness, Asphalt), Test methods, Roofs, Bituminous coatings, Transition temperature, Performance(Engineering), Brittleness.

A modified Fraass brittle point test is used to study the hardening of asphalts that accompanies accelerated weathering. Four roofing asphalts exhibit variations in the initial brittle point temperature that may be related to the performance of the materials in an accelerated weathering test. The progressive hardening accompanying weathering is followed by an increase in the brittle point temperature. (Author)

AD-618 817 Div. 14/7, 17/5

National Research Council of Canada, Ottawa (Ontario). Div. of Building Research.
HOW STEEL PRIMER PAINTS PERFORMED AT EXPOSURE POINTS ACROSS CANADA.
Research paper,
by John Harris. Jul 65, 11p Rept nos. RP-262; NRC-8566
Unclassified report

Pub. in Canadian Paint and Varnish v39 n5 p52-9 May 1965 (Copies available only to DDC users).

Descriptors: (*Steel, Paints), (*Paint primers, Environmental tests), Canada, Experimental data, Thickness, Performance(Engineering), Oxidation, Corrosion, Plastic paints, Vegetable oils, Lead compounds, Oxides, Zinc compounds, Chromates, Degradation, Aging(Materials), Iron compounds, Corrosion inhibition.

AD-618 878 Div. 14/8, 4/4
CFSTI Prices: HC$1.00 MF$0.50

Redstone Scientific Information Center, Redstone Arsenal, Ala.
SYNTHESIS, POLYMERIZATION, AND COPOLYMERIZATION OF POLYORGANOSILOXANES CONTAINING METHACRYLATE GROUPS. II. INVESTIGATION OF POLYMERIZATION AND COPOLYMERIZATION BY MEANS OF IR SPECTRA,
by I. A. Alekseeva, G. A. Semerneva, L. A. Samarina, M. A. Bulatov, and S. S. Spasskii. 3 Nov 64, 9p
Rept. no. RSIC-160
TT 65-62809
Unclassified report

Trans. of Vysokomolekulyarnye Soedineniya (USSR) v6 n2 p265-8 1964.

Descriptors: (*Silicone plastics, Spectra(Infrared)), (*Siloxanes, Polymers), (*Infrared spectroscopy, Siloxanes), Acrylic resins, Polymerization, Copolymerization, Absorption spectrum, Band spectrum, Chemical bonds, Styrene plastics, USSR.

By comparing the ratios of the optical densities of absorption bands in the IR spectra of methacrylate polysiloxanes, the percentages of double bonds involved in polymerization and copolymerization reactions were determined. It is shown that with increase of the distance between linkages containing methacrylate groups, the number of reacted double bonds increases in a polymerization. Copolymerization with styrene in all the investigated cases led to practically complete reaction of the double bonds. The use of the indicated ratio of optical densities gives the possibility of determining the number of linkages in a polysiloxane chain containing methacrylate substituents. (Author)

AD-618 890 Div. 14/10
CFSTI Prices: HC$3.00 MF$0.75

Forest Products Lab., Madison, Wis.
COMPARISON OF WOOD PRESERVATIVES IN STAKE TESTS (1965 PROGRESS REPORT).
Research note,
by J. Oscar Blew, Jr. and John W. Kulp. May 65, 68p Rept. no. FPL-02
Unclassified report

See also AD-437 932.

Descriptors: (*Wood, Preservation), (*Preservation, Effectiveness), Tests, Plywood, Pressure, Degradation, Paper, Laminated plastics, Creosote, Petroleum, Isoptera, Copper compounds, Zinc compounds, Polycyclic compounds, Mercury compounds, Fatty acid esters, Phenols, Chlorine compounds, Impregnation, Protective treatments, Oils, Environmental tests.

Test stakes of southern pine sapwood 2 by 4 inches (nominal) by 18 inches in size were treated by pressure and nonpressure processes and installed in decay and termite exposure sites at various times since 1938 at the Harrison Experimental Forest, Saucier, Miss., Madison, Wis., Bogalusa, La., Jacksonville, Fla., and the Canal Zone, Panama. Also included in the tests at Saucier, Miss., are smaller pine stakes and those of treated and untreated plywood, modified woods, laminated paper plastic, and pine infected with Trichoderma mold. Southern pine untreated control stakes have had an average life of about 1 year in the Canal Zone, 2 to 3 years in Mississippi, Florida, and Louisiana, and about 6 years in Wisconsin. Superficial treatments by 3-minute dipping and brushing with preservatives such as coal-tar creosote and petroleum oils containing copper naphthenate, zinc naphthenate, phenyl mercury oleate, and pentachlorophenol added a few months to 4 years to the life of the untreated stakes. Some waterborne preservatives provided less protection to the stakes than the standard preservative oils, such as coal-tar creosote and pentachlorophenol solutions, when preservative retentions have corresponded to those in commercial use. Other waterborne preservatives, during the time they were in test, produced results that compare favorably with those from the standard preservative oils. (Author)

AD-618 891 Div. 14/10
CFSTI Prices: HC$3.00 MF$0.75

Forest Products Lab., Madison, Wis.
WESTERN WOOD DENSITY SURVEY.
Rept. no. 1.
Jul 65, 64p Rept. no. FPL-27 Unclassified report

Limited number of copies containing color other than black and white are available until stock is exhausted. Reproductions will be made in black and white only. Prepared jointly by Intermountain Forest and Range Experiment Station, Ogden, Utah; Pacific Northwest Forest and Range Experiment Station, Portland, Oreg.; and Pacific Southwest Forest Range Experiment Station, Berkeley, Calif.

Descriptors: (*Wood, Density), Tensile properties, Physical properties, Trees, Forestry, Ecology, Tables.

Mean specific gravities by Forest Survey Units are presented for 9 species of the 23 sampled by the Western Wood Density Survey. Environmental relationships and strength-property relationships with specific gravity are discussed. (Author)

AD-618 902 Div. 14/4, 4/3, 4/4
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
POLYMERIZATION OF ACRYLONITRILE IN PRESENCE OF FURAN DERIVATIVES,
by S. D. Savranskaya, S. N. Trubitsina, and M. A. Askarov. 22 Jul 65, 12p
Rept. no. FTD-TT-65-413
TT 65-62814

Unclassified report

Unedited rough draft trans. of mono. Karbotsepnye Vysokomolekulyarnye Soedineniya. Sbornik Statei, n.p., 1963 p20-5.

Descriptors: (*Fibers(Synthetic), Acrylonitrile polymers), (*Acrylonitrile polymers, Preparation), (*Nitriles, Polymerization), (*O-heterocyclic compounds, Polymerization), (*Polymerization, Inhibition), Free radicals, Copolymerization, Aldehydes, Alcohols, Radiation chemistry, USSR.

An investigation was made of radical polymerization of acrylonitrile in the presence of furan derivatives: furfural, furfuryl alcohol and sylvan. Their inhibiting effect was shown in the process of polymerization, whereby furfural appears to be the strongest inhibiting agent, even stronger than furfuryl alcohol and sylvan. Radiation-chemical initiation of AN polymerization was carried out in the presence of furan derivatives under the effect of gamma radiations at various dosages. It was shown that the given process affects a series of factors. Furan derivatives exert an inhibiting effect on the reaction of polymerization, whereby in this case the strongest inhibiting agent also appears to be furfural. (Author)

AD-618 925 Div. 17/4, 17/5, 17/7
CFSTI Prices: HC$2.00 MF$0.50

Materials Research Lab., Inc., Richton Park, Ill.
THE USE OF STRAIN SOFTENING TO IMPROVE THE PROPERTIES OF REFRACTORY METALS.
Final rept.,
by E. J. Ripling and S. Zager. Mar 65, 46p
Contract NOw64 0247c

Unclassified report

See also AD-425 148.

Descriptors: (*Refractory metals, Mechanical working), (*Refractory metal alloys, Mechanical working), (*Steel, Mechanical working), Tungsten alloys, Molybdenum alloys, Titanium alloys, Tungsten, Ductility, Recrystallization, Temperature, Cold working, Deformation, Stresses, Tensile properties, Mechanical properties, Strain(Mechanics), Rolling(Metallurgy), Sheets.

The strain softening characteristics of a cold rolled mild steel, the cobalt base alloy V-36 and a number of refractory alloys were investigated. It was found that softening by flexing was able to significantly improve the notch bend ductility and smooth tensile ductility of the steel. The ductility of the cobalt base alloy, on the other hand, was not significantly altered by flexing. Although the smooth bend properties of molybdenum and tungsten were not altered beyond the 'as-received' scatter range, flexing produced a significant improvement in the notch bend ductility especially of the 0.5 Ti-Mo alloy. Test results on cold rolled molybdenum sheet also indicate that a stronger produce with improved formability could be obtained by substituting cold rolling plus flexing for the present process of warm rolling plus stress relieving. (Author)

AD-618 926 Div. 17/4, 26/1
CFSTI Prices: HC$3.00 MF$0.75

Foreign Technology Div., Wright-Patterson AFB, Ohio.
INVESTIGATIONS ON HEAT-RESISTANT ALLOYS, 1962, VOL. 9 (SELECTED ARTICLES).
30 Mar 64, 91p Rept. no. FTD-MT-63-206
TT 65-62806; N64 26093

Unclassified report

Edited machine trans. of Issledovaniya po Zharoprochnym Splavam (USSR) v9 p42-6, 66-72, 87-8, 133-9, 187-9, 218-48 1962.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Heat-resistant metals + alloys, Reports), Nickel, Nickel alloys, Diffusion, Hot working, Thermal stresses, Rupture, Aluminum coatings, Zone melting, Niobium, Extrusion, Welding, Fracture(Mechanics), Molybdenum, Castings, Crystal lattice defects.

Contents: Regularity of diffusion of nickel in alloys on nickel base in comparison with heat-resistant properties of these alloys, Increase of criteria of stress-rupture strength during thermomechanical treatment, The behavior of materials in conditions of protracted action of cyclical thermal stresses, Increase of heat resistance of alloy EI-867 with the help of aluminum coating, Zone purification of niobium by the electric arc method, Influence of a plastic shell and die angle on the outflow during the extrusion of heat-resistant alloys, Metallurgical ways of preventing hot cracks during automatic welding under flux of heat-resistant nickel alloys, On alloying weld metal with molybdenum during arc welding of heat-resistant alloys on a nickel base, Possibility of control of the distribution of irregularities of the crystal lattice in cast highly alloyed alloys.

AD-618 956 Div. 14/6
CFSTI Prices: HC$1.00 MF$0.50

Naval Research Lab., Washington, D. C.
SURFACE CHEMICAL METHODS OF DISPLACING WATER AND/OR OILS AND SALVAGING FLOODED EQUIPMENT. PART 4. AGGRESSIVE CLEANER FORMULATIONS FOR USE ON CORRODED EQUIPMENT.
Interim rept.,
by H. R. Baker and P. B. Leach. 15 Jun 65, 18p
Rept. no. NRL-6291
Proj. SR007 08 04, Task 0617

Unclassified report

See also AD-608 193.

Descriptors: (*Salvage, Electronic equipment), (*Electronic equipment, Cleaning), (*Corrosion, Cleaning compounds), (*Cleaning compounds, Corrosion), (*Electrical equipment, Cleaning), Surface-active substances, Gels, Viscosity, Inhibition, Alcohols, Sulfonates, Corrosion inhibition.

The surface chemical techniques previously reported for the removal of oily contamination, sea water, and fresh water from electronic and electrical equipment after flooding are not designed to remove the corrosion products which often form on some parts of equipment after salt water exposure. Thickened 'paint-on' spot-cleaning compositions were developed for the removal of such corrosion from aluminum, copper, brass, steel, cadmium plate, and zinc plate. The formulations employ solid chemicals to the maximum extent possible, the solids being combined with water or commercially available mineral acids just before use. The use of such aggressive cleaners may advantageously precede the surface chemical treatment described previously. (Author)

AD-618 971 Div. 17/2, 25/2

Canadian Armament Research and Development Establishment, Valcartier (Quebec).
MECHANICAL TWINNING IN PEARLITE,
by H. P. Tardif. 1962, 2p
Unclassified report

Pub. in The Journal of the Australian Institute of Metals v8 n4 p415-6 1963 (Copies available only to DDC users).

Descriptors: (*Pearlite, Crystal structure), (*Crystal structure, Pearlite), Steel, Castings, Grain boundaries, Explosion effects, Ferrites, Deformation.

AD-618 974 Div. 17/2, 17/4, 17/6

Alberta Univ., Edmonton. Dept. of Mining and Metallurgy.
THE BETA to ALPHA TRANSFORMATION IN TITANIUM.
Technical note,
by M. J. Bibby and J. Gordon Parr. 21 Aug 63, 2p
Rept. no. TN-116
Unclassified report

Pub. in Journal of the Institute of Metals v92 p341-2 1963-64 (Copies available only to DDC users).

Descriptors: (*Titanium, Grain structures(Metallurgy)), (*Grain structures(Metallurgy), Transformations), (*Martensite, Titanium), Cooling, Thermodynamics, Phase studies, Physical properties, Canada.

The evidence presented can be interpreted as indicating that the martensitic transformation in pure titanium is isothermal.

AD-618 981 Div. 17/2, 17/7

Toronto Univ. (Ontario).
THE TRANSITION FROM PLANE TO CELLULAR INTERFACE IN SOLIDIFYING TIN-LEAD-ANTIMONY ALLOYS,
by G. S. Cole and W. C. Winegard. 2 Sep 63, 6p
Paper no. 2248
Grant DRB9535 01
Unclassified report

Pub. in Journal of the Institute of Metals v92 p322-6 1963-1964 (Copies available only to DDC users).

Descriptors: (*Tin alloys, Transformations), (*Lead alloys, Transformations), (*Antimony alloys, Transformations), Solid solutions, Canada, Grain structures-(Metallurgy), Phase studies.

The transition from plane to cellular interface in ternary tin alloys containing lead + antimony was determined experimentally. The transition between the planar and the non-planar interface can be plotted on a graph of initial concentration vs. the ratio of temperature gradient to rate of solidification, in a manner analogous to that describing the plane to cell transition in binary alloys. The observed results indicate an interaction between the lead and the antimony atoms in the alloy, which can be interpreted by assuming that the equilibrium distribution coefficient of the lead atoms has decreased as a result of the addition of the antimony atoms. (Author)

AD-618 982 Div. 17/2, 17/7

Toronto Univ. (Ontario).
DENDRITE SPACING IN TIN-LEAD ALLOYS,
by J. A. E. Bell and W. C. Winegard. 27 Jun 63, 3p
Paper no. 2253
Grant DRB9535 01
Unclassified report

Pub. in Journal of the Institute of Metals v92 p357-9 1963-1964 (Copies available only to DDC users).

Descriptors: (*Tin alloys, Grain structures(Metallurgy)), (*Lead alloys, Grain structures(Metallurgy)), (*Grain structures(Metallurgy), Measurement), Crystal growth, Crystal structure, Metallic crystals, Temperature, Solid solutions, Furnaces, Canada.

The dendrite spacing in tin-lead alloys, solidified vertically under steady-state conditions, was measured as a function of the rate of growth R, the temperature gradient in the liquid G sub L, and the amount of solute lead. All these growth parameters were varied independently. The dendrite spacing decreases as R and G sub L increase, and increases as the lead content increases. (Author)

AD-618 998 Div. 17/2
CFSTI Prices: HC$2.00 MF$0.50

Watervliet Arsenal, N. Y.
A SURVEY OF ALLOY-EUTECTIC SOURCES FOR ALIGNED STRUCTURES.
Technical rept.,
by Richards H. Harrington. Jul 65, 39p
Rept. no. WVT-6523
Proj. 1LO 13001A91A
Unclassified report

Descriptors: (*Eutectics, Fiber metallurgy), (*Alloys, Eutectics), (*Fiber metallurgy, Eutectics), Fibers, Tables, High-pressure research, Oxides, Carbides.

A nearly complete evaluation of known binary alloy eutectic systems has been made with the exceptions of incomplete listing of Rare Earth Metals and of Refractory Metals. Seventy-seven eutectic systems are listed as unfavorable for production of useful whisker (or aligned) structures. Twenty-eight binary eutectic systems are listed as being possible sources for beneficially aligned structures. Some limitations are discussed. The relative value of using high pressure to increase yield quantities is indicated for specific systems. The high cost for high pressure yields does not appear warranted in any case, (at least for sometime to come). (Author)

AD-619 011 Div. 14/5
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
A METHOD FOR OBTAINING VNII NP-235 HIGH TEMPERATURE LUBRICANTS,
by E. M. Oparina, L. N. Sentyurikhina, N. S. Dokunikhin, L. M. Egorova, and V. G. Dmitrieva.
24 Jul 63, 3p Rept. no. FTD-TT-61-485
TT 65-62827

Unclassified report

Unedited rough draft trans. of Patent (USSR) 131 433, appl. no. 640859/23, 9 Oct 60.

Descriptors: (*Heat-resistant materials, Silanes), (*Lubricants, Silanes), (*Silanes, Preparation), Viscosity, Ketones, Polycyclic compounds, Patents, USSR.

The method for obtaining VNII NP-235 high-temperature lubricants based on organosilicon compounds is characterized by the fact that compounds of the dibenzanthrone or isodibenzanthrone series are used as thickening agents in order to increase the work capability of lubricants around 250C. (Author)

AD-619 152 Div. 17/5, 17/2
CFSTI Prices: HC$2.00 MF$0.50

Rock Island Arsenal, Ill.
ANODIC PASSIVATION OF STAINLESS STEEL.
Technical rept.,
by Linden H. Wagner. May 65, 50p
Rept. no. TR65-1190
Proj. DA1L013001A91A

Unclassified report

Descriptors: (*Stainless steel, Corrosion inhibition), (*Corrosion inhibition, Stainless steel), (*Protective treatments, Stainless steel), Films, Oxides, Corrosion resistant alloys, Electrochemistry, Salt spray tests, Corrosion, Anodes, Coatings.

Cathodic activation, anodic and immersion passivation treatments on types 310, 321, 410 stainless steel panels, and M1 gas cylinders were investigated in 5% solutions of Na2SO4, Na2Cr2O7. Passivation in 20% HNO3 containing 2% Na2Cr2O7 was conducted as described in MIL-STD-171A. A Sargent Recorder, Model MR, an automatic self-balancing potentiometer, was used to measure potentials with reference to a normal Calomel-cell and a salt bridge in contact with a stainless steel panel in an auxiliary vessel containing 0.001N NaCl. Potential vs. time measurements were plotted graphically to show the effects of the treatments on the stainless steels. Passivation treatments increased the positive potential; activation increased the negative potential; half-cell potential measurements showed a decay in panel potential vs. time in air exposure. Passivated panels in salt spray exposure afforded slightly better protection than the control panels. Passivated panels in outdoor exposure showed no appreciable difference between the types of stainless steels in the prevention of corrosion. (Author)

AD-619 193 Div. 17/2, 17/7
CFSTI Prices: HC$1.00 MF$0.50

Frankford Arsenal, Philadelphia, Pa.
DETERMINATION OF INTERFACIAL ENERGIES BETWEEN SOLID COPPER AND BINARY BISMUTH-THALLIUM LIQUID METAL COMPOSITIONS.
Test rept.,
by Bernard J. Rogus. Jul 65, 24p Rept. no. R-1769

Unclassified report

Descriptors: (*Liquid metals, Compatibility), (*Copper, Surface properties), (*Bismuth alloys, Corrosive liquids), (*Thallium alloys, Corrosive liquids), (*Corrosion, Liquid metals), Brittleness, Grain boundaries, Temperature.

Interfacial energies were determined at 1250 F, 950 F, and 650 F between solid copper and binary bismuth-thallium liquid metal alloys. Interfacial energies were determined between the copper and the liquid metal environment as the relative proportions of bismuth and thallium in the liquid metal were varied. Results showed that progressive additions of thallium to bismuth raises the interfacial energies between the resulting liquid metal environments and the solid copper. Interfacial energy values calculated for 1250 F ranged from 278 ergs/sq cm for a liquid metal composition of 100 per cent bismuth to 360 ergs/sq cm for a composition of 100 per cent thallium. Interfacial energies between solid copper and liquid bismuth-thallium environments increase as the temperature decreases in the range of 1250 F to 650 F. The effect of thallium on increasing the interfacial energy becomes more pronounced as the temperature decreases. (Author)

AD-619 194 Div. 14/8
CFSTI Prices: HC$2.00 MF$0.50

Naval Ordnance Test Station, China Lake, Calif.
STRENGTH OF REINFORCED PLASTICS UNDERGOING RAPID HEATING.
Technical publication,
by Warren K. Smith. Sep 65, 26p
Rept. no. NOTS-TP-3852
Task RMGA811 041 216 1F009 07 01
NAVWEPS 8769

Unclassified report

Descriptors: (*Laminated plastics, Test methods), Heating, Tensile properties, Test equipment, Phenolic plastics, Asbestos, Reinforcing materials, Dielectric properties, Pyrometers, Aging(Materials), Temperature, Fracture(Mechanics).

Dielectric heating and infrared pyrometry were combined to make possible a method for determining the strength of nonmetallic materials undergoing rapid heating. Test results are presented for 41-RPD phenolic-asbestos plastic laminate with and without postcuring. (Author)

AD-619 201 Div. 17/7
CFSTI Prices: HC$2.00 MF$0.50

Denver Research Inst., Colo.
RESEARCH ON THE SAMARIUM-TYPE INTERMEDIATE PHASES OF INTRA-RARE-EARTH BINARY SYSTEMS.
Technical rept. for 1 Jan 64-1 Jun 65,
by C. E. Lundin. Jun 65, 37p
Contract Nonr366102

Unclassified report

Descriptors: (*Lanthanum alloys, Lutecium alloys), (*Neodymium alloys, Lutecium alloys), (*Scandium alloys, Gadolinium alloys), (*Rare earth elements, Phase studies), Metallography, Hardness, Density, Solid solutions, Transition temperature, X-ray diffraction analysis, Crystal lattices.

Four new binary intra-rare earth systems were investigated by metallography, hardness, and density measurements to confirm the presence of the intermediate samarium-type phase. The systems were: La-Lu, Nd-Lu,

Sc-Gd, and Sc-La. The lutetium systems exhibited isomorphism with previous binary intra-rare earth systems, whereas the scandium systems did not. Thermal analysis and resistivity techniques were employed to determine the temperature at which the samarium phase forms in representative intra-binary systems. The thermal analysis and resistivity curves did not indicate reproducible thermal arrests or inflections. The thermodynamics of the intra-binary rare earth systems are being studied by liquid metal solution calorimetry. It was found that the solution of light rare earths were relatively easy in tin, whereas the heavy rare earths were very slow. Other liquid metal calorimeter baths are presently being investigated such as bismuth and indium. Indium shows much more promise for the solution of heavy rare earths. (Author)

AD-619 208 Div. 17/4, 17/2, 26/1
CFSTI Prices: HC$1.00 MF$0.50

Westinghouse Electric Corp., Bloomfield, N. J.
RECRYSTALLIZATION VARIABLES OF FLAT ROLLED MOLYBDENUM-COBALT ALLOYS,
by R. H. Schnitzel, W. A. Taebel, and V. E. Lambert.
1951, 23p
Contract NOrd10276
NAVORD 3073

Unclassified report

Descriptors: (*Recrystallization, Molybdenum alloys), (*Molybdenum alloys, Cobalt alloys), Metallography, Temperature, Aging(Materials), Deformation, Impurities, Tensile properties, Ductility, Heat treatment, Powder metals, Rolling(Metallurgy).

The relationship between microstructure and mechanical properties, and the recrystallization variables, temperature, amount of deformation, impurity content, and type of molybdenum powder, have been studied for rolled Mo-Co alloys. Temperature and time at temperature were found to be the most important variables. The 1/2 hour recrystallization temperature, as determined metallographically for Mo-0.15 Co alloy worked 50% was 950C. The alloy was completely recrystallized at 1100C. The anneal that gave the most desirable combination of tensile strength and ductility was 1/2 hour at 1000C followed by a slow furnace cool. The alloy was 10% to 30% recrystallized by this anneal. Increasing the cobalt content from .01 to .15 percent did not appear to alter the recrystallization range of temperature. (Author)

AD-619 286 Div. 14/7, 17/4
CFSTI Prices: HC$1.00 MF$0.50

Metals and Controls, Inc., Attleboro, Mass.
STUDY OF DUCTILE COATINGS FOR THE OXIDATION PROTECTION OF COLUMBIUM AND MOLYBDENUM ALLOYS.
Bimonthly progress rept. no. 1, 1 Mar-30 Apr 65,
by J. F. Clarke and E. H. Girard. 30 May 65, 22p
Contract NOw65 0340f

Unclassified report

See also AD-608 135.

Descriptors: (*Coatings, Refractory metals alloys), (*Molybdenum alloys, Coatings), (*Niobium alloys, Coatings), (*Protective treatments, Oxidation), Platinum, Ductility, Diffusion, Rhenium, Tungsten, Hafnium, Tungsten alloys, Iridium alloys, Rhenium alloys, Carbon alloys, Aluminum alloys, Nickel alloys, Silicon compounds, Carbides, Zirconium compounds, Oxides, Magnesium compounds, Aluminum compounds, Bonding, Vapor plating, High-temperature research, Degradation.

Platinum is being investigated as a ductile, oxidation resistant coating for protection of columbium and molybdenum alloys at temperatures to 3000F. While its oxidation resistance has been found to be excellent, its value as a protective coating for the given substrate alloys rapidly deteriorates as a result of platinum-substrate alloy interdiffusion. It is the prime concern of this contract, therefore, to develop a barrier to this degrading interdiffusion. Twelve materials have been selected for initial evaluation potential diffusion barriers. Roll bonding, hot press bonding, electron beam evaporation and chemical vapor deposition techniques are being used for fabrication of composite coating-barrier-substrate test samples. Screening tests will be conducted in flowing air at 2550F to determine the relative merits of the various coating-substrate combinations. (Author)

AD-619 312 Div. 17/5
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
INTERNAL FRICTION PEAKS IN THE HIGH CHROMIUM AND HIGH CHROMIUM-NICKEL STEELS AT ELEVATED TEMPERATURES,
by Ching-Ping Kung. 27 Jul 65, 19p
Rept. no. FTD-TT-64-1011
TT 65-62917

Unclassified report

Edited trans. of Wu Li Hsueh Pao (Chinese People's Republic) v17 n5 p237-45 1961.

Descriptors: (*Stainless steel, Internal friction), Chromium alloys, Nickel alloys, Titanium alloys, High-temperature research, Measurement, Heat of activation, Austenite.

Several internal friction peaks were observed in four grades of high chromium steels and eight grades of high chromium-nickel steels in the measurement at elevated temperatures by means of a low-frequency torsional pendulum. In three ferritic high chromium steels (27Cr, 25CrTi and 20Cr) quenched from an elevated temperature, an internal friction peak was observed in the vicinity of 570C. The activation energy associated with this internal friction peak for the specimens of 27Cr and 20Cr was found to be about 87,000 cal/mole. In the specimens of the above-mentioned three high chromium steels, which were furnace-cooled from an elevated temperature, an additional friction peak appeared in the vicinity of 640C. In the specimens of the 13Cr grade, which were furnace-cooled from an elevated temperature, an internal friction peak was observed in the vicinity of 610C. In all eight austenitic high chromium-nickel steels an internal friction peak was observed in the neighborhood of 730C. The activation energy associated with this internal friction peak, determined in the 18Cr 18Ni specimens, was about 85,000 cal/mole. The origins of these friction peaks were discussed on the basis of the preliminary experimental results. (Author)

AD-619 334 Div. 17/4, 26/1, 30/3
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
THERMOELECTRIC CHARACTERISTICS OF METALLIC SINTERED ALLOYS ON A TUNGSTEN AND MOLYBDENUM BASE,
by N. I. Svede-Shvets, Yu. A. Eiduk, V. A. Enina, L. S. Vodopyanova, and Yu. V. Trushin. 4 Aug 65, 16p
Rept. no. FTD-TT-65-642
TT 65-62940

Unclassified report

Edited trans. of Tsentral'nyi Nauchno-Issledovatel'

skii Institut Chernoi Metallurgii. Sbornik Trudov (USSR), n30 p7-16 1963.

Descriptors: (*Thermoelectricity, Powder alloys), (*Powder alloys, Thermoelectricity), (*Tungsten alloys, Thermocouples), (*Molybden alloys, Thermocouples), USSR, Iron alloys, Nickel alloys, Aluminum alloys, Niobium alloys, Tantalum alloys, Cobalt alloys.

AD-619 369 Div. 14/25, 25/2
CFSTI Prices: HC$3.00 MF$0.75

Honeywell Research Center, Hopkins, Minn.
MECHANICAL BEHAVIOR OF POLYCRYSTALLINE MAGNESIUM OXIDE AT HIGH TEMPERATURES.
Technical rept.,
by R. B. Day and R. J. Stokes. Jul 65, 55p
Rept. nos. HR-65-269, TR-30
Contract Nonr407600, Proj. NR032 451
Unclassified report

Descriptors: (*Ceramic materials, Deformation), (*Magnesium compounds, Oxides), (*Deformation, Magnesium compounds), (*Fracture(Mechanics), Magnesium compounds), Crystal lattice defects, Grain boundaries, Crystals, Porosity, Recrystallization, Transition temperature, Brittleness, Ductility, High-temperature research, Tensile properties, Hot working.

The paper describes high temperature tensile deformation of polycrystalline magnesia prepared by (a) single crystal recrystallization and (b) hot pressing. Recrystallized polycrystalline magnesia goes through a brittle-ductile transition at 1700C (strain rate 0.0001/sec). The brittleness below 1700C is due to a lack of slip systems and grain boundary sliding. At 1700C grain boundary migration produces corrugations in the interface which interfere with sliding. About 1700C the matrix becomes sufficiently plastic through multiple slip and polygonization to accommodate any distortion. Polycrystalline specimens then neck down for completely ductile fracture. Hot pressed magnesia starts to go through a transition at 2200C, i.c., 500C higher. The increase is attributed to the presence of pores and impurity. Porosity is considered to promote grain boundary sliding by (a) providing the source for intergranular sliding, (b) decreasing the interfacial contact area, (c) preventing grain boundary migration and corrugation. These observations confirm that high temperature deformation occurs by dislocation glide and climb and grain boundary sliding and migration. (Author)

AD-619 372 Div. 14/8, 4/3
CFSTI Prices: HC$2.00 MF$0.50

General Precision, Inc., Little Falls, N. J. Aerospace Research Center.
HIGH-TEMPERATURE-RESISTANT PHTHALOCYANINE POLYMERS.
Quarterly progress rept. no. 3, 1 May-31 Jul 65.
12 Aug 65, 39p
Contract Nobs92081
Unclassified report

See also AD-611 537.

Descriptors: (*Heat-resistant plastics, Phthalocyanines), (*Phthalocyanines, Polymers), Siloxanes, Organoboranes, Molecular structure, Copolymerization, Thiocyanoates, Hydroxides, Chlorides, Oxidation, Pyrolysis, Stability.

PcSi(SCN)2 was prepared from PcSiCl2 and silver thiocyanate. Spectral evidence indicated that the product has the normal configuration (S-bonded) rather than the iso configuration (N-bonded). Two polymeric materials were isolated when equimolar amounts of PcSi(OH)2 and bis(hydroxymethyl)carborane were heated at 400C under nitrogen. Both products appear to be polymers at different molecular weights. It was determined that excess bis(hydroxymethyl)carborane was required to drive the sulfuric acid solution condensation reaction with PcSiCl2 to completion. PcSi(SCN)2 and bis(hydroxymethyl)carborane reacted at 200C to give a numer of different condensation products. One appeared to be a 1:1 condensation product, a second a 2:1 condensation product; and a third a 3:2 condensation product similar to the 3:2 condensation product previously isolated from PcSi(NCO)2 and bis(hydroxymethyl)carborane and appears to be a dicarboranyl ether bonded to a siloxy phthalocyanine. The 3:2 product polymerized by dehydration when heated to 400C in nitrogen. Boric oxide was the main product in air at 400C. (Author)

AD-619 376 Div. 14/9, 4/:
CFSTI Prices: HC$2.00 MF$0.50

Wyandotte Chemicals Corp., Mich.
SYNTHESIS OF LOW TEMPERATURE OIL RESISTANT URETHANE ELASTOMERS.
Final rept. for 1 Jul-31 Dec 63 and 15 May 64-15 May 65,
by Seymour L. Axelrood and Wayne J. Lajiness.
15 May 65, 44p
Contract DA20 018ORD24883, Proj. 1C0 24401A110
Unclassified report

See also AD-613 360.

Descriptors: (*Elastomers, Synthesis(Chemistry)), (*Isocyanate plastics, Elastomers), Low-temperature research, Oils, Absorption, Alcohols, Ethers, Glycols, Nitriles, Halogenated hydrocarbons, Amines, Plasticizers, Polyethylene plastics, Physical properties, Elasticity, Furan resins, Synthetic rubber, Tensile properties.

The preparation of polyether urethane elastomers is described, and the effect of variation in polyether backbone, formulation and processing on their properties evaluated. Special attention was given to attaining elastomers with low temperature flexibility at -55C. combined with <10% ASTM No. 3 oil absorption when immersed 70 hours at 100C. By using high molecular weight polyether polyols prepared from approximately equal molar quantities of ethylene oxide and tetrahydrofuran, these two target properties were achieved with only a slight compromise in tensile strength requirements. The key factor in the preparation of elastomers with good oil resistance was the concentration of the polar linkages and crosslinks between long, flexible polyether chains. The low temperature flexibility was attained by using the ethylene glycol-tetrahydrofuran polyols to provide the long, flexible polyether chains. Cast urethane-urea elastomers have been prepared from blends of high molecular weight polyethers and polytetramethylene ether glycols which meet the mechanical strength, compression set at 100C, and low temperature flexibility at -55C. requirements of the contract. However, the oil resistance requirement was not satisfied. (Author)

AD-619 381 Div. 17/7
CFSTI Prices: HC$4.00 MF$1.00

Pitman-Dunn Inst. for Research, Frankford Arsenal, Philadelphia, Pa.
OPTICAL PROPERTIES OF THE ALPHA PHASE

ALLOYS, AgZn AND AgCd.
Final rept.,
by Eugene L. Green. Jun 65, 135p Rept. no. R-1765
Proj. 1P014501B11A

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Silver alloys, Optical properties), Phase studies, Zinc alloys, Cadmium alloys, Silver, Dielectric properties, Electron transitions, Atomic energy levels, Reflectometers.

Reflectance measurements at near-normal incidence were performed on chemically polished, annealed, polycrystalline samples of the alloys AgZn and AgCd. Data was obtained for pure silver and for alloy samples with 2.5, 5.0, 10.0, 20.0 and 30.0 percent IIB atom concentration. A dual beam vacuum reflectometer built in the Solid State Physics Laboratory at Temple University electron volts at temperatures of 110K, 295K, and 400K with a precision of 2% of measured reflectance. The dielectric constants, the coefficients 4pik/lampda, and the energy loss functions were computed by the Kramers-Kronig method. The results presented graphically in the interval from 2 e.v. to 7 e.v. relate mainly to interband absorption. The trends of the dielectric constants with either zinc or cadmium concentration are basically similar. The principle epsilion sub 2 peak of silver at 4.0 e.v. moves to higher energies with increase of IIB atom concentration. A secondary peak, observed only in the alloys, moves to lower energies. Transitions probably occur in the alloys from an underlying d band to the Fermi surface and also from Fermi surface up to the s band. Trends of the epsilion sub 2 peaks with concentration of zinc or cadmium follow an elementary rigid band model.

AD-619 382 Div. 14/6, 13/1

Foreign Technology Div., Wright-Patterson AFB, Ohio.
HIGH TEMPERATURE HEAT-TRANSFER AGENTS,
by A. V. Chechetkin. 9 Apr 65, 438p
Rept. no. FTD-MT-63-246
TT 65-62982

Unclassified report

Edited machine trans. of mono. Vysokotemperaturnye Teplonositeli, Moscow, 1962 p1-427.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is not available for public sale.

Descriptors: (*Heat exchangers, Materials), (*Coolants, Physical properties), (*Refrigerants, Physical properties), Thermal properties, Aerodynamic characteristics, Heating, Cooling, Molecular structure, Fluid dynamic properties, Liquids, Vapors, Dust, Liquid metal coolants, USSR.

The properties of high-temperature heat-transfer agents are described, the necessary data for thermal and aerohydrodynamic calculations of processes of heating and cooling with the help of these heat-transfer agents are given; diagrams of heating installations and information on their arrangement and operation are given, and the areas of possible application of each high-temperature heat-transfer agent are shown. (Author)

AD-619 383 Div. 14/5, 10/2, 4/2, 4/3

Foreign Technology Div., Wright-Patterson AFB, Ohio.
ADDITIVES TO OILS AND FUELS (COLLECTION OF ARTICLES),
ed. by S. E. Krein, P. I. Sanin, V. N. Monastyraskii, and E. A. Eminov. 6 Apr 65, 672p
Rept. no. FTD-MT-64-213
TT 65-62983

Unclassified report

Edited machine trans. of mono. Prisadki k Maslam i Toplivam, Moscow, 1961 p1-395.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is not available for public sale.

Descriptors: (*Fuel additives, Synthesis(Chemistry)), (*Lubricant additives, Synthesis(Chemistry)), (*Chemistry, USSR), (*Additives, Synthesis(Chemistry)), Machines, Mechanical engineering, Petroleum industry, Antioxidants, Corrosion inhibition, Cleaning compounds, Wear resistance, Oils, Fuels, Metalorganic compounds, Organic compounds.

In the collection are reports heard at the Scientific and Technical Conference on Additives to Oils and Fuels, devoted to the synthesis of detergent, antioxidant, anti-corrosive, antiwear and other additives, investigation of mechanism of their action, methods of investigation of effectiveness of additives, results of laboratory, stand and operational tests of oils and fuels with different additives. Contemporary tendencies in area of development of machines and mechanisms and requirements presented for quality of oils and fuels are briefly illustrated. The collection is designed for workers of scientific research organizations of petroleum, machine-building and other branches of industry occupied with development, research and tests of additives, engineering-technical workers, producing additives and oil products with additives, and also for engineering-technical workers of machines and mechanisms and use of oil products. (Author)

12. Mathematical Sciences

AD-618 690 Div. 15/1
CFSTI Prices: HC$5.00 MF$1.25

Carnegie Inst. of Tech., Pittsburgh, Pa.
Graduate School of Industrial Administration.
NEW ALGORITHMS AND CUTTING PLANE CONSTRAINTS FOR THE SOLUTION OF DIOPHANTINE LINEAR PROGRAMS,
Management sciences research rept. (Doctoral thesis),
by Fred Glover. Feb 65, 181p Rept. no. MSRR-36
Contract Nonr76024, Proj. NR047 048
Unclassified report

Descriptors: (*Linear programming, Algebra), (*Numerical analysis, Linear programming), Combinatorial analysis, Search theory, Operations research.

This thesis presents two computational algorithms for solving the integer linear programming problem and a class of cutting plane constraints that may be employed as part of an algorithmic solution strategy. The first algorithm, called the 'bound escalation method,' is close related to the all-integer algorithm of Ralph Gomory. The principal point of contrast lies in the concept of the bounding form, which the method is designed specifically to create and then exploit. The second algorithm, called the 'multiphase-dual method,' a more specialized method designed to solve the 0-1 linear programming problem. This method, which is combinatorial in nature, patterns after the additive algorithm of Egon Balas, and employs an array of tests applied in conjunction with a 'surrogate constraint' to eliminate large portions of the solution space from consideration. The cutting plane constraints, finally, are generated from a general equation in two parameters. Theorems are proved which specify values for these parameters that yield cuts having certain properties not found in the other cuts in the literature. (Author)

AD-618 745 Div. 15/1
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Berkeley.
ADIABATIC INVARIANCE. II. ELIPTIC MOTION ABOUT A SLOWLY VARYING CENTER OF FORCE.
Technical rept.,
by J. E. Littlewood. Jan 65, 39p
Contract Nonr22260, Proj. NR041 221
Unclassified report

Descriptors: (*Invariance, Motion), (*Motion, Perturbation theory), Differential equations, Integration, Potential theory.

AD-618 746 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

California Univ., Berkeley.
ADIABATIC INVARIANCE III: THE EQUATION X= -VX(X,W),
by J. E. Littlewood. Jun 65, 24p
Contract Nonr22260, Proj. NR041 221
Unclassified report

Descriptors: (*Invariance, Differential equations), (*Motion, Perturbation theory), Integration, Potential theory.

AD-618 747 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

California Univ., Berkeley.
ADIABATIC INVARIANCE IV: NOTE ON A NEW METHOD FOR LORENTZ'S PENDULUM PROBLEM.
Technical rept.,
by J. E. Littlewood. Jun 65, 13p
Contract Nonr22260, Proj. NR041 221
Unclassified report

Descriptors: (*Invariance, Numerical methods and procedures), (*Motion, Perturbation theory), Differential equations, Iterative methods, Potential theory.

AD-618 748 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

Operations Research Center, Univ. of California, Berkeley.
OPTIMIZATION IN OPERATIONS RESEARCH: SOME EXAMPLES,
by George B. Dantzig. Apr 65, 11p
Rept. no. ORC-65-10
Contracts Nonr22283, Nonr365602
Unclassified report

Descriptors: (*Operations research, Optimization), (*Optimization, Operations research), Linear programming, Decision theory, Numerical analysis, Partial differential equations.

AD-618 750 Div. 15/1
CFSTI Prices: HC$3.00 MF$0.75

Operations Research Center, Univ. of California, Berkeley.
SENSITIVITY ANALYSIS OF NETWORKS,
by Richard Wollmer. Apr 65, 62p
Rept. no. ORC-65-8
Contract Nonr22283; Grant NSF GP2633
Unclassified report

Descriptors: (*Networks, Statistical analysis), (*Linear programming, Networks), (*Analysis of variance, Networks), Algebraic topology, Iterative methods, Stochastic processes, Optimization, Sensitivity.

A maximum flow network is defined by a set of arcs and a set of points called nodes. Each arc joins two nodes and has associated with it a positive capacity which represents the maximum amount of flow that may pass over it. One of the nodes is designated as the source and another as the sink. From these nodes, arc, and capacities the maximum amount of flow that may pass from source to sink may be calculated. This investigation is concerned with a sensitivity analysis on such networks. Specifically, each arc of the network is assumed to be subject to breakdowns which result in a reduction in its capacity. The problem is to find the greatest reduction in maximum flow possible if n breakdowns occur and to find where these breakdowns must occur for this reduction to result. The methods developed in this report solve this problem for a certain class of networks known as planar networks.

AD-618 757 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

Operations Research Center, Univ. of California, Berkeley.
MULTI-TERMINAL SHORTEST PATHS,
by T. C. Hu. Apr 65, 17p
Rept. no. ORC-65-11
Contract Nonr22283; Grant NSF GP2633
Unclassified report

Descriptors: (*Operations research, Linear programming), Matrix algebra, Networks, Optimization.

The present paper gives an algorithm that finds simultaneously the shortest paths between many pairs of nodes in a given network. In the book by Berge, the values of shortest paths between many pairs of nodes are found. Here, use is made of a special matrix multiplication technique to find the actual arcs that are used to form the shortest paths. In a network with n nodes, log sub 2 (n-1) special matrix multiplications are needed to find all the shortest paths. The present paper also gives an algorithm for constructing a network with prescribed shortest distances and with the total distances associated with arcs a minimum. (Author)

AD-618 787 Div. 15/2

Carnegie Inst. of Tech., Pittsburgh, Pa.
TOW PROBABILITY LIMIT THEOREMS AND AN APPLICATION,
by M. M. Rao. 1961, 9p
Contract AF33 616 3878; Grant NSF G14832
Unclassified report

Pub. in Akademie van Wetenschappen, Amsterdam. Proceedings, series A v64 n5 and Indag. Math. v23 n5 p552-9 1961 (Copies available only to DDC users).

Descriptors: (*Distribution theory, Probability), (*Probability, Distribution theory), Transformations-(Mathematics), Analysis of variance, Stochastic processes, Theorems.

A necessary and sufficient condition that the limit distribution of a log-normal random variable be normal as the mean becomes large is presented. A similar result for the non-central chi-square random variable is also included. A set of sufficient conditions, following some recent work of Trotter's, is given for the limit normality, without assuming moments, for a class of distributions depending on a continuous parameter that tends to infinity. Application of these results to some transformations in the analysis of variance when the mean values are large is indicated. (Author)

AD-618 793 Div. 15/1

Columbia Univ., New York.
AN INVARIANT FOR CERTAIN SMOOTH MANIFOLDS,
by James Eells, Jr. and Nicolaas H. Kuiper.
1963, 21p
Contract Nonr26657; Grant NSF G13989
Unclassified report

Pub. in Annali di Matematica pura ed Applicata v60 (Ser4) p93-110 1963 (Copies available only to DDC users).

Descriptors: (*Algebraic topology, Invariance), (*Invariance, Algebraic topology), Spheres, Differential geometry, Topology.

Starting with Hirzebruch's A-genus, a numerical invariant for certain (4k-1) manifolds is defined. Examples are produced to show how this invariant can distinguish differentiable structures on certain topological manifolds.

AD-618 795 Div. 15/1, 30/2, 32/2

Michigan Univ., Ann Arbor. Logic of Computers Group.
TURING-MACHINES AND THE ENTSCHEIDUNGS-PROBLEM.
Technical rept.,
by J. Richard Buchi. 30 Nov 61, 13p
Contract Nonr122421; Grant NSF G22258
Unclassified report

Pub. in Mathematische Annalen v148 p201-13 1962 (Copies not available to DDC or Clearinghouse customers). Another version is available from CFSTI $2.60 as AD-268 676.

Descriptors: (*Mathematical logic, Decision theory), (*Decision theory, Mathematical logic), (*Programming-(Computers), Decision theory), Magnetic tape, Machine translation, Machines, Language, Number theory, Computer logic, Meta mathematics.

A discussion of decision theory by use of Turing machines is presented and is determined to be closely related to the quantification theory. Postulates are stated and application of sentence structure is examined by use of recursive logic methods.

AD-618 827 Div. 15/1

Tasmania Univ., Hobart (Australia). Dept. of Mathematics.
SOME ESTIMATES OF THE COEFFICIENTS IN THE CHEBYSHEV SERIES EXPANSION OF A FUNCTION,
by David Elliott and George Szekeres. 11 Mar 64, 8p
Grant AF AFOSR300 63
AFOSR 65-1010
Unclassified report

Pub. in Mathematics of Computation v19 n89 p25-32 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Functions, Series), (*Series, Functions), Polynomials, Numerical analysis, Integral transforms.

AD-618 831 Div. 15/1

Massachusetts Inst. of Tech., Cambridge.
ON FORMS OF DEGREE n PERMITTING COMPOSITION,
by R. D. Schafer. 1961, 17p
Grant NSF G19992
Unclassified report

Pub. in Journal of Mathematics and Mechanics v12 n5 p777-92 Sep 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Algebras, Polynomials), (*Polynomials, Algebras), Theorems, Algebra.

AD-618 835 Div. 15/1

Duke Univ., Durham, N. C. Dept. of Mathematics.
OPEN IDEALS IN C(X),
by Lowell A. Hinrichs. 21 Nov 63, 10p
Grants AF AFOSR62 162, NSF81 6199, Proj. 9749, Task 974901
AFOSR 65-1004
Unclassified report

Pub. in Pacific Journal of Mathematics v14 n4 p1255-63 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Topology, Set theory), (*Groups-(Mathematics), Topology), (*Rings, Topology), Functional analysis.

A group topology on the ring C(X), of all real-valued, continuous functions on X, is said to have the ideal closure property (I. C. P.), in case the closure of any ideal is simply the intersection of all maximal ideals containing it. This paper considers which ideals of C(X) can be open with respect to such a topology. A

characterization of such ideals is given and it is shown that the family F, of all such ideals, is itself a fundamental system of neighborhoods of zero with respect to a ring topology having I. C. P. The 2 extremes are considered where F is the family of all ideals and where F consists only of finite intersections of maximal ideals. Finally it is shown that if R is a countable discrete subset of the Stone-Cech compactification of X, then intersect (M(P); p contained in R) contained in F if and only if R is C-embedded in X union R. (Author)

AD-618 838 Div. 15/2

Cornell Univ., Ithaca, N. Y.
ASYMPTOTICALLY OPTIMUM SEQUENTIAL INFERENCE AND DESIGN,
by J. Kiefer and J. Sacks. 5 Mar 63, 46p
Unclassified report

Research done in cooperation with Northwestern Univ., Evanston, Ill., under Grant NSF G24500, and supported in part by Office of Naval Research, Washington, D.C.
Pub. in Annals of Mathematical Statistics v34 n3 p705-50 Sep 1963 (Copies available only to DDC users).
Revision of manuscript submitted 8 Aug 62.

Descriptors: (*Sequential analysis, Combinatorial analysis), (*Combinatorial analysis, Sequential analysis), Statistical tests, Decision theory, Statistical distributions.

AD-618 840 Div. 15/1

Technische Hochschule, Munich (Germany).
GENERALIZED MULTISTEP PREDICTOR-CORRECTOR METHODS,
by William B. Gragg and Hans J. Stetter. Nov 63, 23p
Unclassified report

Pub. in Journal of the Association for Computing Machinery v11 n2 p188-209 Apr 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Numerical methods and procedures, Optimization), Differential equations, Integration, Errors, Mathematical prediction, Operators-(Mathematics).

The order p which is obtainable with a stable k-step method in the numerical solution of $y' = f(x,y)$ is limited to $p = k + 1$ by the theorems of Dahlquist. In the present paper the customary schemes are modified by including the value of the derivative at one 'nonstep point;' as usual, this value is gained from an explicit predictor. It is shown that the order of these generalized predictor-corrector methods is not subject to the above restrictions; stable k-step schemes with $p = 2k + 2$ have been constructed for k less than or = to 4. Furthermore it is proved that methods of order p actually converge like h(p) uniformly in a given interval of integration. Numerical examples give some first evidence of the power of the new methods. (Author)

AD-618 851 Div. 15/1

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
A STABILITY THEORY FOR NONLINEAR MIXED INITIAL BOUNDARY VALUE PROBLEMS,
by R. K. Brayton and W. L. Miranker. 19 Jun 64, 20p
Contract AF49 638 1139
AFOSR 65-1023
Unclassified report

Pub. in Archive for Rational Mechanics and Analysis v17 n5 p358-76 1964 (Copies available only to DDC users).

Descriptors: (*Stability, Theorems), (*Boundary value problems, Theory), (*Nonlinear differential equations, Boundary value problems), Functional analysis.

This paper discusses the notion of complete stability of mixed initial boundary problems for systems of partial differential equations. The discussion is not restricted to the purely linear case. Moreover, the boundary conditions are permitted to take the form of systems of nonlinear ordinary differential equations. The principal result of the paper is a method for constructing so-called Liapounov functionals by means of which the stability statement is obtained. A second result is a theorem which shows that complete stability follows from the existence of a Liapounov functional. A number of examples are included.

AD-618 908 Div. 15/1
CFSTI Prices: HC$3.00 MF$0.75

Illinois Univ., Urbana.
REAL ZEROS OF THE DEDEKIND ZETA FUNCTION OF AN IMAGINARY QUADRATIC FIELD.
Technical rept.,
by Marc Edmon Low. Aug 65, 53p Rept. no. TR-15
Contract Nonr183418, Proj. NR043 194
Unclassified report

Descriptors: (*Special functions(Mathematical), Real numbers), (*Real numbers, Special functions-(Mathematical)), Number theory, Series, Polynomials.

AD-618 964 Div. 15/1

Tennessee Univ., Knoxville.
SEPARATION OF THE n-SPHERE BY AN (n-1)-SPHERE,
by James C. Cantrell. 24 Jul 62, 11p
Grant NSF G8239
Unclassified report

Pub. in Transactions of the American Mathematical Society v108 n2 p185-94 Aug 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Spheres, Separation), Algebraic topology, Theorems, Topology.

AD-618 965 Div. 15/1

Tulane Univ., New Orleans, La.
TOPOLOGICAL LOOPS WITH INVARIANT UNIFORMITIES,
by Sigmund Hudson. 17 Sep 62, 11p
Grant NSF GP9424
Unclassified report

Pub. in Transactions of the American Mathematical Society v109 n1 p181-90 Oct 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Algebraic topology, Invariance), (*Invariance, Algebraic topology), Theorems, Spheres, Numbers, Topology.

The purpose of this paper is, firstly, to make use of a 'natural tool,' namely, a 'group of translates,' for the study of certain loops possessing various uniformities. It is shown in a theorem that: A compact loop L has an invariant uniformity if and only if the group of all translates of L is relatively compact. Next, with the aid of the group of translates it is proved that: A loop with an invariant uniformity on a Euclidean n-sphere is isomorphic to one of the following: the cyclic group of order two, or the complex, the quaternion, or the Cayley numbers of norm one, respectively. Finally, using this result on n-spheres with

invariant uniformity, it is shown that certain diassociative loops with zero on Euclidean n-spaces are isomorphoric to the multiplicative structure of either the real, complex, quaternion, or Cayley numbers.

AD-618 966 Div. 15/1

Utah Univ., Salt Lake City.
SOME BOUNDARY VALUE PROBLEMS FOR LINEAR DIFFERENTIAL SYSTEMS,
by W. J. Coles. 6 Sep 62, 7p
Grant NSF G23719

Unclassified report

Pub. in Proceedings of the American Mathematical Society v14 n6 p956-60 Dec 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Boundary value problems, Linear systems), Differential equations, Matrix algebra.

AD-618 972 Div. 15/1

Massachusetts Inst. of Tech., Cambridge.
ON THE INDEX THEOREM,
by Leif-Norman Patterson. 20 Dec 62, 31p
Grant NSF G21938

Unclassified report

Pub. in American Journal of Mathematics v85 n2 p271-97 Apr 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Theorems, Differential geometry), (*Differential geometry, Theorems), Boundary value problems, Functional analysis.

This paper purports to present an account of the general index problem in Riemannian geometry from a geometric point of view, to point out some of the most important index theorems, and to study some continuity questions related to the index problem. The results obtained are: 1. All self-adjoint boundary-value problems arising in Riemannian geometry can be interpreted geometrically in terms of separate endmanifolds. 2. The subsequent extension of an index theorem of Ambrose to all such problems, in particular to that associated with periodic geodesies. 3. The continuous dependence (with some exceptions) of the Ambrose conjugate points on the boundary conditions and on the Riemannian metric on the manifold.

AD-618 976 Div. 15/2

Harvard Univ., Cambridge, Mass.
COMPARISON OF TWO METHODS OF HANDLING COVARIATES IN DISCRIMINATORY ANALYSIS.
Rept. for 1 Jun 36-31 May 64,
by William G. Cochran. 1964, 13p
Contract Nonr186637, Proj. NR042 097

Unclassified report

Pub. in Annals of the Institute of Statistical Mathematics. Twentieth Anniversary Volume v16 p43-53 1964 (Copies available only to DDC users).

Descriptors: (*Analysis of variance, Statistical tests), Discriminants, Classification, Probability, Statistical functions, Decision theory.

AD-618 987 Div. 15/1

California Univ., Los Angeles.
CLASSIFICATION OF LOCALLY EUCLIDEAN SPACES,
by Leo Sario. 8 Mar 64, 26p
Grant DA ARO D31 124G499
AROD 1517:73

Unclassified report

Pub. in Nagoya Mathematical Journal v25 p87-111 Mar 1965 (Copies available only to DDC users).

Descriptors: (*Algebraic topology, Classification), Potential theory, Green's function, Boundary valve problems, Functional analysis, Complex variables, Operators(Mathematics).

The classification of Riemann surfaces has largely reached its completion. The purpose of the present paper is to lay the foundation for a new intriguing field in the classification theory: Riemannian spaces with Euclidean metrics. The paper is self-contained, both for the Riemann surface expert and the reader whose main interest is with higher dimensions. The significance of locally Euclidean spaces lies, first of all, in that their function-theoretic nature differs for dimensions n>2 and n=2. The existence or nonexistence of Green's functions and positive or bounded harmonic functions in Rn, punctured Rn, and in the punctured flat torus offer simple examples. A striking phenomenon is that, despite such differences, the basic inclusion relations remain valid. Moreover, capacities and null-classes can be defined for components of point sets in Rn.

AD-618 990 Div. 15/1

Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
DOMAINS OF DEPENDENCE FOR MIXED PROBLEMS FOR WAVE EQUATIONS,
by Erich Zauderer. 12 Aug 63, 10p
Grant GP2003

Unclassified report

Pub. in Archive for Rational Mechanics and Analysis v15 n1 p69-78 1964 (Copies available only to DDC users).

Descriptors: (*Partial differential equations, Boundary value problems), (*Set theory, Partial differential equations), Integrals, Geometry, Functional analysis.

The energy integral method in its usual form involving the use of the characteristic conoid is easily extended to yield a uniqueness theorem for mixed problems for the wave equation. Friedlander ('Sound pulses.' Cambridge, Cambridge Univ. Press, 1958. Proc. of the Cambridge Philosophical Society 45:395 (1949)) noted this and used it to determine the fronts of disturbances in the shadow region resulting from mixed problems with homogeneous boundary conditions. It is shown how these fronts may be used to obtain a uniqueness theorem for such mixed problems with smooth boundaries, and, thereby, domains of dependence and influence for such problems, with homogeneous boundary conditions. These domains are smaller than those obtained from the usual energy integral method referred to above and coincide with those of the solutions of several particular mixed problems.

AD-618 992 Div. 15/1

Rutgers-The State Univ., New Brunswick, N. J.
EQUIVALENCE AND DECOMPOSITION OF VECTOR FIELDS ABOUT AN ELEMENTARY CRITICAL POINT. Revised ed.,
by Kuo-Tsai Chen. 27 Sep 63, 34p
Grant NSF GP481

Unclassified report

Pub. in American Journal of Mathematics v85 n4 p693--22 Oct 1963 (Copies not available to DDC or Clearinghouse customers)
Revision of manuscript submitted 20 Jun 63.

Descriptors: (*Vector analysis, Differential equations), (*Functional analysis, Differential equations), Matrix algebra, Groups(Mathematics), Mapping(Transformations), Algebra.

AD-618 995 Div. 15/1

Rutgers - The State Univ., New Brunswick, N. J.
DECOMPOSITION AND EQUIVALENCE OF LOCAL VECTOR FIELDS,
by Kuo-Tsai Chen. 2 Apr 63, 3p
Grant NSF GP481

Unclassified report

Pub. in Proceedings of the National Academy of Sciences v49 n5 p740-1 May 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Matrix algebra, Theory), Transformations(Mathematics), Algebras, Topology, Vector analysis.

AD-619 073 Div. 15/2
CFSTI Prices: HC$4.00 MF$0.75

Stanford Univ., Calif. Dept. of Statistics.
BOUNDS AND RATES OF CONVERGENCE FOR THE EXTENDED COMPOUND ESTIMATION PROBLEM IN THE SEQUENCE CASE.
Technical rept.,
by Donald D. Swain. 17 Jun 65, 104p Rept. no. TR-81
Contract Nonr22553, Proj. NR042 002

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Statistical analysis, Decision theory), (*Decision theory, Statistical analysis), Optimization, Sequences, Probability, Operations research.

AD-619 077 Div. 15/2, 32/8
CFSTI Prices: HC$6.00 MF$1.50

Harvard Univ., Cambridge, Mass.
CONTRIBUTIONS TO THE NONRESPONSE PROBLEM IN SAMPLE SURVEYS.
Doctoral thesis,
by Poduri Sree Ranga Sambasiva Rao. Jan 65, 252p
Contract Nonr186637; Grant NSF GP683, Proj. NR042 097

Unclassified report

Descriptors: (*Sampling, Population), (*Probability, Sampling), Mathematical models, Analysis of variance, Public opinion.

The effectiveness of Call-backs is studied and the optimum number of calls required for different situations is found. The consequences of the Duplication without matching' method of imputation are examined, as are those of the 'Duplication with matching' method.

AD-619 078 Div. 15/2
CFSTI Prices: HC$4.00 MF$1.00

Harvard Univ., Cambridge, Mass.
A QUADRATIC MODEL FOR MULTIVARIATE PREDICTION.
Doctoral thesis,
by Roger Allan Carlson. Feb 65, 144p
Contract Nonr186637; Grant NSF G13040,
Proj. NR042 097

Unclassified report

Descriptors: (*Mathematical prediction, Statistical analysis), (*Mathematical models, Mathematical prediction), Sampling, Analysis of variance, Bessel functions, Integrals.

A step is taken toward the development of non-linear models for multivariate prediction. The usual method for constructing a predictor function involves fitting a linear combination of the predictand (independent) variables which minimize the mean square error (m.s.e.) of prediction. The justification given for this method is that although the 'true' relation among the variables is probably not a linear one, the linear function is a reasonable approximation locally. To obtain a non-linear prediction model consider the following: in addition to the best linear predictor (b.l.p.) for the predictand (dependent variable) compute the b.l.p. for the square of the predictand. Then if X denotes the predictand we have, for each set of observations on the independent variables, a (linear) prediction for X and a (linear) prediction for X-squared. The present work is concerned with methods of combining these two predictions to yield a single prediction for X. The hope, of course, is that this new predictor will represent an improvement.

AD-619 104 Div. 15/1

Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
ON DIRECT SUMS AND TENSOR PRODUCTS OF NON-LINEAR PROGRAMS,
by Bertram Mond. 28 May 64, 15p
Rept. no. ARL-65-85

Unclassified report

Pub. in Zeitschrift fuer Wahrscheinlichkeitstheorie v4 p27-39 1965 (Copies available only to DDC users).

Descriptors: (*Nonlinear programming, Combinatorial analysis), Tensor analysis, Vector analysis, Algebra, Quadratic programming.

AD-619 110 Div. 15/2

California Univ., Los Angeles.
OPTIMAL SPACING AND WEIGHTING IN POLYNOMIAL PREDICTION,
by P. G. Hoel and A. Levine. 7 May 64, 10p
Grant AF AFOSR62 158, Proj. 9749, Task 974902
AFOSR 65-1037

Unclassified report

Pub. in Annals of Mathematical Statistics v35 n4 p1553-60 Dec 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Polynomials, Mathematical prediction), (*Mathematical prediction, Polynomials), Curve fitting, Analysis of variance, Optimization, S-matrix.

A solution is given to the problem of how to determine at which points in the interval (-1, 1) observations should be taken and what proportion of the observation should be taken at each such point so as to minimize the variance of the predicted value of a polynomial regression curve at a specified point beyong the interval observations. The solution obtained states that the points are to be chosen

to be Chebychev points and the number of observations are to be selected proportional to the absolute value of the corresponding Lagrange polynomial at the specified point. The preceding Chebychev solution becomes the minimax solution for the interval (-1, t), provided t> t sub 1 > 1 where t sub 1 is a value satisfying a certain equation. Under the customary normality assumptions, the Chebychev solution to the prediction problem is used to construct a confidence band for a polynomial curve that will possess minimum width at any specified point beyond the interval of observations. (Author)

AD-619 121 Div. 15/1

Yale Univ., New Haven, Conn.
ON THE DUAL STIEFEL-WHITNEY CLASSES OF A MANIFOLD,
by W. S. Massey and F. P. Peterson. 1963, 14p
Grant NSF G18995

Unclassified report

Research done in cooperation with Massachusetts Inst. of Tech. and partially supported by U. S. Army Research Office.
Pub. in Boletin de la Sociedad Matematica Mexicana, p1-13 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Algebraic topology, Theory), Groups-(Mathematics), Inequalities, Algebra, Topology.

Theorems are proved which assert that for certain values of n and k, the (n - k)-dimensional dual Stiefel-Whitney class of an n-dimensional manifold is always zero.

AD-619 124 Div. 15/1

Wisconsin Univ., Madison.
LIMITS OF POLYNOMIALS WITH RESTRICTED ZEROS,
by J. Korevaar. 1962, 8p
Grant NSF G19925

Unclassified report

Pub. in Studies in Mathematical Analysis and Related Topics p183-90 1962 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Polynomials, Sequences), Functions, Set theory, Power series, Geometry.

Early results on limits and convergence of polynomials with restricted zeros were obtained by Polya. This paper concentrates on recent work in the area by the author and some of his students. A variety of conjectures are included. (Author)

AD-619 125 Div. 15/1

Massachusetts Inst. of Tech., Cambridge.
AN "ALTERNIERENDE VERFAHREN" FOR GENERAL POSITIVE OPERATORS,
by Gian-Carlo Rota. 1962, 9p
Grant NSF G19684

Unclassified report

Pub. in Bulletin of the American Mathematical Society v68 n2 p95-102 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Measure theory, Operators(Mathematics)), (*Operators(Mathematics), Measure theory), Stochastic processes, Functional analysis.

AD-619 127 Div. 15/2

California Univ., Berkeley. Statistical Lab.
ROBUSTNESS OF THE HODGES-LEHMANN ESTIMATES FOR SHIFT.
Revised ed.,
by Arnljot Hyland. 10 Aug 64, 25p
Contract Nonr22243, Proj. NR042 036

Unclassified report

Pub. in Annals of Mathematical Statistics v36 n1 p174-97 Feb 1965 (Copies not available to DDC or Clearinghouse customers).
Revision of manuscript submitted 6 Feb 64.

Descriptors: (*Statistical tests, Statistical distributions), (*Statistical distributions, Statistical tests), Probability, Distribution theory, Pseudo-random systems.

AD-619 130 Div. 15/1

Yale Univ., New Haven, Conn.
SINGLY-GENERATED LIOUVILLE F-ALGEBRAS,
by F. T. Birtel. 7 Jun 63, 7p
Grants GP59, Nonr G0031 61

Unclassified report

Prepared in cooperation with Tulane Univ., New Orleans, La. Pub. in Michigan Mathematical Journal v11 p89-94 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Algebras, Functions), Algebraic topology, Complex numbers, Theorems.

AD-619 165 Div. 15/1
CFSTI Prices: HC$2.00 MF$0.50

Southern Illinois Univ., Carbondale.
ON ALGEBRAIC CURVES WHICH ARE ACTUAL OR APPROXIMATE SOLUTIONS TO AUTONOMOUS AND NON-AUTONOMOUS 2nd ORDER ORDINARY DIFFERENTIAL EQUATIONS.
Final technical rept.,
by J. C. Wilson. Jul 65, 44p
Contract DA31 124ARO D238; Grant DA ARO D31 124G305, Projs. 009925001, 20011501B704
AROD 3127:2

Unclassified report

Descriptors: (*Differential equations, Algebra), (*Algebra, Differential equations), Numerical analysis, Differential geometry.

AD-619 178 Div. 15/2
CFSTI Prices: HC$3.00 MF$0.75

Rocketdyne, Canoga Park, Calif.
THE SPECTRAL CHARACTERIZATION AND COMPARISON OF NON-STATIONARY PROCESSES.
Research rept.,
by M. R. Dubman. 2 Aug 65, 83p Rept. no. RR-65-27
Contract Nonr455700, Proj. NR042 240 3 25 64

Unclassified report

Descriptors: (*Stochastic processes, Harmonic analysis), (*Harmonic analysis, Stochastic processes), Time, Series, Integral transforms, Statistical functions.

The spectral representation theories of second order stationary, harmonizable, exponentially convex, and normal-type stochastic processes are reviewed and the processes are compared. Locally stationary and asymptotically stationary processes are viewed within the

framework of harmonizable and normal-type processes. The concept of a time-dependent spectrum is developed, a general condition for its existence is given, and the time-dependent spectra of harmonizable and normal-type processes are derived. (Author)

AD-619 185 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

Columbia Univ., New York.
REPORT ON ACTIVITIES UNDER CONTRACT NONR26657, ACADEMIC YEAR 1963-1964 (INCLUDING THE SUMMER OF 1964),
by S. Eilenberg. 19 Nov 64, 8p
Contract Nonr26657

Unclassified report

Descriptors: (*Algebraic topology, Theory), (*Groups-(Mathematics), Theory), (*Differential geometry, Theory), Set theory, Functional analysis, Transformations-(Mathematics).

Summaries are presented of work done in the following fields: Differentiable transformation groups, Curvature in differential geometry, Properties of commuting functions on the real line, Structure of minimal sets.

AD-619 211 Div. 15/1, 16/4
CFSTI Prices: HC$3.00 MF$0.75

California Univ., Berkeley. Dept. of Mathematics.
A SEARCH METHOD IN CONVEX PROGRAMMING.
Technical rept.,
by Michael Rogson. Feb 65, 61p
Contract Nonr22285, Proj. NR049 170

Unclassified report

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Descriptors: (*Search theory, Mathematical programming), (*Mathematical programming, Search theory, Linear programming, Nonlinear programming, Mathematical models, Biology.

A search method for solving both the linear programming problem and a more general class of convex programming problems with the 7090 computer, using artificial evolution techniques, is presented. Flow diagrams are given for the program. In special cases, the results of this method and the known values are compared. Also tables of the computed results are given. (Author)

AD-619 218 Div. 15/1, 15/2
CFSTI Prices: HC$1.00 MF$0.50

George Washington Univ., Washington, D. C. Logistics Research Project.
STATISTICAL DECISION ANALYSIS OF A LINEAR PROGRAMMING PROBLEM WITH A STOCHASTIC OBJECTIVE FUNCTION,
by Jerome Bracken. 26 Jul 65, 16p
Serial no. T-183
Contracts Nonr76103, Nonr76105, Projs. NR345 107, NR047 001

Unclassified report

Descriptors: (*Decision theory, Statistical analysis), (*Linear programming, Decision theory), Stochastic processes, Inequalities, Monte Carlo method, Integration.

A linear programming problem is considered where the constraints are deterministic and the criterion function is a random variable. This stochastic linear programming problem is formulated as a statistical decision problem. When action is to be taken on the basis of a prior distribution of the criterion variable, or on the basis of its distribution posterior to a sample, the decision problem reduces to a standard linear programming problem. Solutions for expected value of perfect information and expected value of sample information are obtained by several procedures. Extreme point solutions of the linear inequality constraints, regarded as the set of alternative solutions available to the decision maker, are used as input to a Monte Carlo integration procedure and as input to a numerical integration procedure. Solutions found by standard algorithms are also used as input to a numerical integration procedure. (Author)

AD-619 219 Div. 15/1
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
ON THE REPRESENTATION OF INTERGERS AS SUMS OF DISTINCT TERMS FROM A FIXED SEQUENCE,
by Jon Folkman. Aug 65, 32p
Memo no. RM-4528-PR
Contract AF49 638 700

Unclassified report

Descriptors: (*Number theory, Sequences), Numerical analysis, Series.

Consideration is given a problem that has received considerable attention recently. Let a sub 1, a sub 2, a sub 3, . . . be a sequence of positive integers. If every sufficiently large integer can be represented as a sum of distinct terms from this sequence, one says that the sequence is complete. The general problem is: Characterize complete sequences. This memorandum considers this problem for the class of sequences which are either increasing with a sub n = 0(n alpha) or strictly increasing with a sub n = 0(n 1+alpha), where 0 < alpha < 1. It shows that a necessary and sufficient condition for such a sequence to be complete is that at least one term from every infinite arithmetic progression should be representable as a sum of distinct terms from the sequence. (Author)

AD-619 227 Div. 15/2, 25/5

California Univ., Berkeley. Statistical Lab.
AN INVARIANCE PRINCIPLE FOR THE LAW OF THE ITERATED LOGARITHM.
Technical rept.,
by V. Strassen. 20 Jul 64, 17p Rept. no. ONR-63
Contract Nonr22243, Proj. NR042 036

Unclassified report

Pub. in Zeitschrift fur Wahrscheinlichkeitstheorie v3 n3 p211-26 1964 (Copies available only to DDC users).

Descriptors: (*Invariance, Iterative methods), (*Iterative methods, Invariance), Sequences, Distribution theory, Probability, Functional analysis, Motion.

AD-619 228 Div. 15/2

California Univ., Berkeley. Statistical Lab.
NUMERICAL EVALUATION OF HODGES-LEHMANN ESTIMATES.
Technical rept.,
by Arnljot Hoyland. 18 Mar 64, 8p
Rept. no. ONR-59
Contract Nonr22243, Proj. NR042 036

Unclassified report

Pub. in Det Kongelige Norske Videnskabers Selskabs

Forhandlinger v37 n9 p42-7 1964 (Copies available only to DDC users).

Descriptors: (*Numerical analysis, Statistical tests), (*Statistical tests, Statistical distributions), Real numbers, Statistical analysis.

AD-619 265 Div. 15/2
CFSTI Prices: HC$1.00 MF$0.50

Rocketdyne, Canoga Park, Calif.
RESEARCH ON SPECTRAL ANALYSIS.
Final summary rept. for 15 Jun 64-30 Jun 65,
by N. R. Goodman and M. R. Dubman. 30 Jul 65, 22p
Rept. no. R-6265
Contract Nonr455700

Unclassified report

Descriptors: (*Stochastic processes, Series), Integral transforms, Statistical tests, Time, Harmonic analysis, Statistical functions.

Included are discussions of: (1) The spectral characterization and comparison of nonstationary processes. (2) Statistical tests for nonstationarity of time series. (3) Spectra of time varying spectral measurements. (4) Estimation problems for processes of normal type.

AD-619 270 Div. 15/2
CFSTI Prices: HC$2.00 MF$0.50

Rocketdyne, Canoga Park, Calif.
STATISTICAL TESTS FOR STATIONARITY WITHIN THE FRAMEWORK OF HARMONIZABLE PROCESSES.
Research rept.,
by N. R. Goodman. 2 Aug 65, 42p Rept. no. RR-65-28
Contract Nonr455700, Proj. NR042 240

Unclassified report

Descriptors: (*Statistical tests, Series), (*Series, Time), Statistical analysis, Stochastic processes, Harmonic analysis.

Time series are viewed within the framework of harmonizable processes and certain of their properties described under the hypothesis of stationarity. Corresponding statistics obtained from a sample of the time series are derived which provide a basis for testing the stationarity hypothesis. The distributions of these statistics are given and descriptions of the types of nonstationary that cause these tests to fail are presented. (Author)

AD-619 281 Div. 15/1, 8/7

Michigan Univ., Ann Arbor.
MONOTONE REDUCTION ALGORITHMS,
by R. F. Arnold and D. L. Richards. 1963, 2p
Grant AF AFOSR367 63
AFOSR 65-0586

Unclassified report

Available only for reference use at DDC Field Services. Copy is not available for public sale.

Descriptors: (*Mathematical programming, Communication theory), Set theory, Word association.

The main body of the paper is devoted to showing that a finite rank ordered word problem always has a unique 'best' monotone reduction algorithm, and that this 'core' algorithm is the unique result of self-applying an arbitrary reduction algorithm.

AD-619 298 Div. 15/1, 30/2
CFSTI Prices: HC$3.00 MF$0.75

System Development Corp., Santa Monica, Calif.
SELF-ADMINISTERED INSTRUCTIONS FOR THE TERRITORIES GAME.
Technical memorandum,
by Robert J. Meeker and Gerald H. Shure.
1 Jun 65, 75p Rept. no. TM-2442
Contract SD286

Unclassified report

Descriptors: (*Game theory, Instruction manuals), Bargaining, Programming(Computers), Computers, Display systems, Video signals.

The Territories Game is one of a series of games that has been developed to study bargaining and negotiation processes and behavior as these are exhibited under the relatively controlled and defined conditions of a laboratory setting, particularly a computer-based laboratory. The game is representative of a class of games that involves both cooperative and conflicting interests which are resolved through tacit communications (actions and maneuvers rather than direct verbal communications). This document contains the individual self-administered instructions for a computer version of the Territories Game. Since these instructions are complete and self-contained, they also constitute a complete description of the game rules, legal actions, and procedures for implementing them in the computer setting. In the computer-based laboratory the computer is used as an experimental tool for on-line analysis, umpiring, control and recording of subject behavior, particularly the interaction process that takes place between the bargainers. The laboratory has a Philco 2000 computer and 24 sets of associated on-line television displays and button insertion consoles. These facilities and the associated computer programs permit the game to be played simultaneously by 12 pairs of live players, or by 24 live players paired against 24 players simulated by computer programs. For further details of the research program and associated publications the reader is referred to TM-2304/001/00. (Author)

AD-619 301 Div. 15/1
CFSTI Prices: HC$3.00 MF$0.75

Applied Logic Corp., Princeton, N. J.
SEMI-AUTOMATED MATHEMATICS: SAM IV.
Scientific rept.,
by James H. Bennett, William B. Easton, James R. Guard, David B. Loveman, and Thomas H. Mott, Jr.
15 Oct 64, 93p Rept. no. SR-3
Contract AF19 628 3250, Proj. 5632, Task 563205
AFCRL 64-827

Unclassified report

Descriptors: (*Mathematical logic, Theorems), (*Programming(Computers), Mathematical logic), Computers, Metamathematics, Automatic.

The fourth in a series of computer experiments on theorem proving is described. The man-machine interactive program is designed to handle any mathematical statement that can be expressed by means of many sorted variables and constants for an omega-order predicate-function calculus with equality, lambda, and methods of definition. Natural deduction by subordinate proof is used to carry out proofs. The program includes a convenient input/output language, a language for handling sorts and range of symbols, and an automatic logic routine whose function is to automatically justify proof lines which 'trivially' follow from previous results. (Author)

AD-619 307 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

Institute for Advanced Study, Princeton, N. J.
STUDIES IN ANALYSIS, NUMBER THEORY AND LOGIC.
Final rept. for 1 Jul 63-30 Jun 65,
by Felix E. Browder, Clifford J. Earle, Erik Ellentuck, Tomio Kubota, and Howard L. Resnikoff. 30 Jun 65, 3p
Grant DA ARO D31 124G455, Proj. 3951M
AROD 3951:25

Unclassified report

Descriptors: (*Mathematical analysis, Reports), Number theory, Mathematical logic.

Publications by members of the Institute for Advanced Study (Princeton, New Jersey), for the period from July 1963 to July 1965, are listed for the fields of analysis, number theory, and logic.

AD-619 309 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
ON INVOLUTIONS OF FIVE SPHERE.
Interim technical rept.,
by Chung-Tao Yang. 1965, 6p Rept. no. ITR-4
Grant DA ARO D31 124G177
AROD 2056:15

Unclassified report

Descriptors: (*Topology, Spheres), (*Groups(Mathematics), Transformations(Mathematics)), Differential geometry, Algebraic topology, Projective geometry.

AD-619 310 Div. 15/1
CFSTI Prices: HC$2.00 MF$0.50

Pennsylvania Univ., Philadelphia.
DIFFERENTIABLE ACTIONS ON HOMOTOPY SEVEN SPHERES.
Interim technical rept.,
by D. Montgomery and Chung-Tao Yang. 1965, 34p
Rept. no. ITR-3
Grant DA ARO D31 124G177
AROD 2056:14

Unclassified report

Descriptors: (*Topology, Spheres), (*Groups(Mathematics), Transformations(Mathematics)), Differential geometry, Algebraic topology, Projective geometry.

This report presents studies of differentiable actions of the circle group SO(2) on homotopy 7-spheres. The class of free such actions is shown to form an infinite abelian group which is closely related to the group of differentiable knotted 3-spheres in the 6-sphere. Studies are also presented on actions, each having a 3-sphere as the fixed point set and acting freely otherwise. (Author)

AD-619 352 Div. 15/1

Lehigh Univ., Bethlehem, Pa.
VECTOR FIELDS AND INFINTESIMAL TRANSFORMATIONS ON ALMOST-HERMITIAN MANIFOLDS WITH BOUNDARY.
Revised ed.,
by Arthur L. Hilt and Chuan-Chih Hsiung. 1 Oct 63, 29p
Contract AF49 638 1009, Proj. 9749, Task 974902
AFOSR 65-1035

Unclassified report

Pub. in Canadian Journal of Mathematics v17 p213-38 1965 (Copies available only to DDC users).
Revision of manuscript submitted 10 Jan 62.

Descriptors: (*Matrix algebra, Conformal mapping), (*Algebraic topology, Matrix algebra), Vector analysis, Transformations(Mathematics), Integrals, Operators-(Mathematics), Geodesics.

An investigation is made of vector fields and infinitesimal transformations on almost-Hermitian manifolds with boundary. Riemannian manifolds are considered, as well as Lie derivatives over the manifolds, local boundary geodesic co-ordinates, and integral formulas. A Killing vector field on a compact orientable Riemannian manifold is discussed, and almost-Hermitian, almost-semi-Kahlerian, and almost-Kahlerian structures are defined. Contravariant analytic vector fields are given consideration on an almost-Hermitian manifold M(n) with boundary B(n-1), together with their relations to Killing, projective Killing, and conformal Killing vector fields. Covariant analytic vector fields on an almost-Hermitian manifold with boundary are studied as well as vector fields on an almost-Kahlerian manifold with boundary. (Author)

AD-619 358 Div. 15/2

Princeton Univ., N. J.
WHICH PART OF THE SAMPLE CONTAINS THE INFORMATION,
by John W. Tukey. 1964, 9p
Contract DA31 124ARO D215
AROD 1715:66

Unclassified report

Pub. in Proceedings of the National Academy of Sciences v53 n1 p127-34 Jan 1965.
(Copies not available to DDC or Clearinghouse customers).
Prepared in cooperation with Bell Telephone Labs., Inc., Murray Hill, N. J.

Descriptors: (*Sampling, Sensitivity), Analysis of variance, Stochastic processes, Series.

13. Mechanical, Industrial, Civil, and Marine Engineering

AD-618 696 Div. 26/4, 26/1
CFSTI Prices: HC$4.00 MF$1.00

Virginia Polytechnic Inst., Blacksburg.
AN INVESTIGATION OF STATISTICAL QUALITY CONTROL APPLICATIONS IN A JOB LOT GRINDING PROCESS.
Master's thesis,
by James Horace Reeves. Jul 65, 116p

Unclassified report

Descriptors: (*Quality control, Machining), (*Machining, Production control), Tolerances(Mechanics), Statistical tests, Measurement, Analysis of variance, Grinders.

An investigation was made to study the effect on the variability of a process by changing the dimension of the characteristic which it produces, with the objective of using this knowledge of process variation to establish statistical quality control charts throughout the range of constant variation. The final grinding operations on the internal and external diameters of three different sizes of stator ring assemblies were studied. A study was made of the manufacturing environment and data were collected. Statistical quality control charts were constructed for each production lot sampled. The findings of the statistical tests and the results of the study of the manufacturing environment revealed that the variability of the two grinding processes studied can be held constant over a dimension range of 1.937 inches to 3.7290 inches if the factors of tolerance and measuring practices are held constant. Also, it was found that statistical quality control charts based on a prior knowledge of process variation can be used effectively in the environment of the study. (Author)

AD-618 727 Div. 13/4
CFSTI Prices: HC$5.00 MF$1.00

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ANALYSIS OF LARGE DEFLECTIONS IN STRUCTURES.
Master's thesis,
by Johnson Andrew Jenkins and Thomas Bingham Seitz. Jun 65, 151p Rept. no. GAM/Mech/65B-8

Unclassified report

Descriptors: (*Structures, Deflection), (*Mathematical prediction, Deflection), Loading(Mechanics), Stresses, Mathematical analysis, Nonlinear systems, Equations, Matrix algebra, Compressive properties, Theory.

The purpose of the investigation is to develop equations which predict the large nonlinear deflections of a diamond-shaped frame subjected to loading in tension or compression. Two frames with different combinations of pinned and fixed joints are analyzed through large deflection nonlinear, small deflection nonlinear, and linear (analytical and matrix) analyses so that a comparison of the theories might be made. The results of the large deflection nonlinear analysis are found to agree very well with actual experimental data. A linear matrix analysis of a multi-bay Vierendeel truss is also developed and compared with experimental data. (Author)

AD-618 732 Div. 13/4, 13/10, 22/4, 25/6
CFSTI Prices: HC$2.00 MF$0.50

Naval Weapons Lab., Dahlgren, Va.
STRESS ANALYSIS OF A DAMAGED TRUSS BRIDGE.
Technical memo,
by W. G. Soper. Jun 64, 29p Rept. no. TM-T-9/64

Unclassified report

Descriptors: (*Statics, Bridges), (*Bridges, Explosion effects), (*Terminal ballistics, Bridges), (*Civil engineering, Bridges), Vulnerability, Damage, Supports, Stresses, Mathematical analysis.

A method is presented for determining the loads and deflections in a damaged truss bridge. Any combination of completely or partially severed components can be treated. The analysis is based upon pinned joints, linear force-deflection relations, and simple tensile or compressive loading for all structural members. Application of the method to a bridge containing 116 members is described, and certain results are included. (Author)

AD-618 734 Div. 31/5
CFSTI Prices: HC$3.00 MF$0.75

David Taylor Model Basin, Washington, D. C.
MECHANIZED COMPUTATION OF SHIP PARAMETERS,
by Ralph C. Leibowitz and Robert L. Harder.Jun 65, 92p Rept. no Proj. SR011 01 01

Unclassified report

Descriptors: (*Ship hulls, Structural properties), Programming(Computers), Mathematical analysis, Vibration, Stresses, Digital computers, Programming languages, Loading(Mechanics).

For the purpose of vibration and load analysis a ship hull is often regarded as a flexural beam. The report describes a method and numerical computer (digital) program to calculate ship section properties (i.e., equivalent beam parameters) needed for the beam vibration equations and its internal shear distribution, using data tabulations obtained from hull plans by a preestablished orderly procedure. The program was written in FORTRAN and can be used on an IBM 650, 704, 709, or 7090. Comparison between digital computer and hand calculations for a sample problem shows excellent agreement. (Author)

AD-618 751 Div. 31/4, 31/5
CFSTI Prices: HC$3.00 MF$0.75

David Taylor Model Basin, Washington, D. C.
EXPERIMENTAL DETERMINATION OF STRUCTURAL AND STILL WATER DAMPING AND VIRTUAL MASS OF CONTROL SURFACES.
Research and development rept.,
by Ralph C. Leibowitz and Arthur Kilcullen. Apr 65, 75p Rept. no. 1836

Unclassified report

Descriptors: (*Hulls(Marine), Vibration), (Vibration, Damping), (*Marine rudders, Damping), Destroyers, Submarines, Moment of inertia, Control, Surfaces, Determination, Hydrostatics, Flutter, Experimental data.

An experiment was designed for determining the damping constants and virtual mass for the control surface systems of USS ALBACORE (AGSS 569) and USS SAMPSON (DDG 10); theoretical methods for determining the virtual inertias (including virtual mass)

of these control surfaces are also given. The theoretical foundation for the experimental design and the procedure for analyzing the experimental data to obtain the parameters are described. These damping and inertial parameters are essential to the performance of a hull-control surface vibration and/or flutter analysis. (Author)

AD-618 829 Div. 13/11

National Research Council of Canada, Ottawa (Ontario). Div. of Building Research.
LARGE-SCALE USE OF INERT GAS TO EXTINGUISH BUILDING FIRES,
Research paper,
by J. H. McGuire. 1963, 8p Rept. nos. RP-246, NRC-8502

Unclassified report

Pub. in The Engineering Journal v48 n3 p29-33 Mar 1965 (Copies available only to DDC users).

Descriptors: (*Gas generating systems, Helium group gases), (*Fire extinguishers, Helium group gases), (*Helium group gases, Fire extinguishers), Fires, Buildings, Carbon compounds, Dioxides, Canada.

The widespread use of inert gas as an extinguishing agent involves generation on a massive scale, and it is very probable that any practical generator could be based on a combustion device. Until recently the modified gas turbine appeared to be the most appropriate unit available, but the advent of a novel, small, combustion chamber operating at substantially atmospheric pressure, and producing an output gas of low oxygen content indicates that improved, less costly, large-scale inert gas generators can be developed. It is reasonable to expect that other high-output combustion devices may also become available. The principal limitation in the application of such generators will be high-level gaseous losses, and operational experience is required to determine how frequently the use of inert gas will achieve complete suppression of fire. The use of high-expansion foam to suppress fire at a low level and to reduce the effective height of a building will frequently ease the magnitude of this limitation. (Author)

AD-618 841 Div. 31/3

Woods Hole Oceanographic Institution, Mass.
IMPROVED TOWLINE DESIGN FOR OCEANOGRAPHY,
by R. L. Rather, Vil Goerland, J. B. Hersey, A. C. Vine, and Frances Dakin. 1964, 6p
Contract Nonr402900

Unclassified report

Pub. in Undersea Technology May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Towing cables, Underwater equipment), Cable fairing, Performance(Engineering), Tests, Drag, Velocity, Oceanographic equipment.

The article is concerned with the characteristics of faired and unfaired wires used for towing, monitoring and controlling instruments in the deepest water, at all speeds of the faster research ships. Several designs of towing cable and fairings were tested with a weighted fish on Cruise 43 of the research vessel 'Chain' of the Woods Hole Oceanographic Institution. The towing characteristics of bare wire and two designs of faired wire are presented and compared with towing shapes predicted from theory.

AD-618 843 Div. 26/1

Canadian Armament Research and Development Establishment, Valcartier (Quebec).
SOME OBSERVATIONS ON EXPLOSIVE METALLURGY,
by H. P. Tardif. 1963, 10p

Unclassified report

For presentation at the Annual General Meeting, Montreal, Apr 1964.
Pub. in The Canadian Mining and Metallurgical Bulletin Mar 1964 (Copies available only to DDC users).

Descriptors: (*Explosive forming, Metals), (*Metals, Explosive forming), Iron, Steel, Microstructure, Single crystals, Pearlite, Craterating, Stresses, Tensile properties, Canada.

This paper briefly describes some of the phenomena encountered when materials are submitted to extremely high pressures, such as those produced by the detonation of an explosive charge placed in contact with the material. It was found that extensive changes take place in the microstructure of iron and steel. Diffusion-controlled processes, such as the transformation of lamellar pearlite, the recrystallization and grain growth of ferrite, and the homogenization of the pearlite-ferrite structure, can take place within micro- or milli-seconds. Mechanical twins can propagate without deviation from ferrite to pearlite, thus indicating a proeutectoid ferrite-pearlite-ferrite orientation relationship. The propagation and interaction of intense stress waves in materials was demonstrated with the use of Armco iron. Finally, a comparison is made of the damage produced in metals by the formation of craters made by explosive shock and by hypervelocity impact. (Author)

AD-618 871 Div. 13/1, 27/1, 31/3
CFSTI Prices: HC$7.10 MF$2.00

Foreign Technology Div., Wright-Patterson AFB, Ohio.
SHIPBOARD AND COASTLINE OXYGEN PLANTS,
by G. K. Geinrikhs. 12 Jul 65, 409p
Rept. no. FTD-TT-65-288
TT 65-62805 Unclassified report

Unedited rough draft trans. of mono. Sudovye i Beregovye Kislorodnye Ustanovki, Leningrad, 1963 341p.

Descriptors: (*Oxygen equipment, Engineering), Design, Shipborne, Production, Oxygen, Compressors, Installation, Engines + motors, Liquefied gases, Operation, USSR.

Contents: General information about the technology of obtaining oxygen from atmospheric air by the deep-freezing method; Marine oxygen installations; Special features of installing compressors aboard ships; Expansion engine installation; Pipeline installation; Installing deepfreeze units and air purification devices; Oxygen cisterns and tanks, their servicing and installation; Operation of compressor machinery; Expansion engine operation; Air purification apparatus and servicing them; Engineering process of obtaining oxygen by the deepfreezing method; Floating oxygen cisterns; Methods for decreasing liquid oxygen losses during storage and transportation; Servicing marine oxygen cisterns; Gasification of liquid oxygen; and Controlling the main indicators of an oxygen installation's operation.

AD-618 875 Div. 31/4
CFSTI Prices: HC$4.00 MF$1.00

David Taylor Model Basin, Washington, D. C.

RUDDER-DIVING PLANE-HULL VIBRATION AND FLUTTER ANALYSIS OF USS ALBACORE (AGSS 569),
by Ralph C. Leibowitz and Robert L. Harder.
Jun 65, 139p Rept. no. 1961

Unclassified report

Descriptors: (*Submarine hulls, Flutter), (*Marine rudders, Flutter), Stabilization systems, Submarines, Analog computers, Vibration, Control, Surfaces, Mathematical analysis.

The report presents the results of a 'flutter' analysis for the submarine USS ALBACORE (AGSS 569). The results were obtained both by performing a simple control-surface computation using analytical expressions derived in the report and by computing the rudder-diving plane (and stabilizer)-hull vibrations (including flutter) on an analog computer. The analogs are based upon previously derived theories and methods for representing the vibrating system and for evaluating various control surface-hull parameters. The analytical and analog results are in excellent agreement and indicate that control-surface flutter of ALBACORE will occur at about 90 knots. (Author)

AD-618 901 Div. 13/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
TOMORROW OF WELDING,
by P. Karchenko, B. Efetov, and M. Brenman.
22 Jul 65, 8p Rept. no. FTD-TT-65-425
TT 65-62813

Unclassified report

Trans. of Ekonomicheskaya Gazeta (USSR) n4(129) p4-42 Jan 25 1964.

Descriptors: (*Welding, USSR), Welds, Industrial production, Economics, Structures, Welding fluxes, Welding rods, Industrial plants.

AD-618 904 Div. 26/8, 9/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
DEVICE FOR DISTRIBUTION OF A LIQUID (GAS) AMONG SELF-CONTAINED OBJECTS,
by R. G. Savashvili and G. V. Kukhchik. 2 Aug 65,
6p Rept. no. FTD-TT-65-772
TT 65-62810

Unclassified report

Unedited rough draft trans. of Patent (USSR) 166 153, appl. no. 887028/40-23, 12 Mar 64.

Descriptors: (*Fluids, Distribution), (*Instrumentation, Fluid flow), Patents, Disks, USSR, Design.

The object of the invention is a device for distributing a liquid (gas) over self-contained objects (for example, in flying apparatuses), which contains a separator with outlets with a distributing disk placed in it which has an input and a crossput channel. For increasing the throughput capacity with the same dimensions and weight the openings in the body and the channel in the distributing disk are designed in trapezoidal form. (Author)

AD-618 942 Div. 31/5, 2/9, 32/3
CFSTI Price: MF$2.00

National Oceanographic Data Center, Washington, D. C.
OCEANOGRAPHIC VESSELS OF THE WORLD; VOLUME II. General series,
comp. by Albert M. Bargeski and William H. Myers.
1963, 416p Publication NODC-G-2

Unclassified report

A joint publication prepared in cooperation with IGY World Data Center A for Oceanography, Washington, D. C. Order from National Oceanographic Data Center, Washington, D. C., hard copy $4.50; CFSTI, MF$2.00.

Descriptors: (*Ships, Oceanographic vessels), (*Oceanographic vessels, Catalogs), (*Documentation, Oceanographic vessels), Bibliographies, Photographs, Instrumentation, Specifications, Libraries, Oceanology, Marine engineering.

This publication contains detailed descriptions and photographs of the major oceanographic vessels of the world. Gives indication of oceanographic capabilities of these ships and is useful in planning international cooperative expeditions.

AD-618 955 Div. 13/3
CFSTI Prices: HC$1.00 MF$0.50

National Academy of Sciences - National Research Council, Washington, D. C.
REPORT OF THE PLANNING COMMITTEE ON EUTROPHICATION MAY 8-9, 1965.
1965, 16p

Unclassified report

Descriptors: (*Water pollution, Control), Wastes(Industrial), Urban planning, Public health, Sewage, Wastes(Sanitary engineering), Management planning, Public opinion, Biological contamination, Lakes, United States Government.

Eutrophication of lakes, streams, and estuaries -- the problems resulting from introduction of nutrients to receiving bodies of water -- is the subject discussed. The problems and dangers arising from eutrophication of lakes and other bodies of waters and the resulting difficulties are described. Population and industrial growth, together with intensified agriculture, river-basin development, recreational use of public waters, and domestic and industrial exploitation of shore properties are endangering the nation's waters through enrichment. This enrichment of waters causes changes and/or increases in algae, aquatic vascular plant growth, fish populations, and bottom fauna. Such changes usually interfere with the multiple uses of waters, reduce their esthetic qualities and economic value, and by accelerating the 'aging' of the waters, threaten the destruction of this resource. It is recommended that the general public and the whole scientific community be alerted to the deterioration of the quality of the human environment through the eutrophication of our water resources.

AD-619 016 Div. 26/1, 22/13
CFSTI Prices: HC$2.00 MF$0.50

Naval Ordnance Test Station, China Lake, Calif.
PROPELLER MANUFACTURE BY A NUMERICALLY CONTROLLED MILLING PROCESS,
by David R. Hamilton. Jul 65, 45p
Rept. no. NOTS-TP-3607
Task RUTO3E000 216
NAVWEPS 8595

Unclassified report

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Descriptors: (*Propellers(Marine), Machining), (*Milling

machines, Automation), Torpedoes, Programming-(Computers), Quality control, Costs.

The report describes the process by which a torpedo propeller was produced on a numerically controlled milling machine. The process involved several steps. First, a geometric conversion routine translated the design data from conventional blueprint form to a set of rectangular coordinates. These converted data were expanded into a more complete array by means of interpolation routines. Then, through the use of the APT (Automatic Programmed Tools) computer system, programs were processed that converted the expanded data into the commands that actually machined the propeller. It is expected that propellers machined in this fashion will eventually be more accurate and less costly than conventionally produced propellers. (Author)

AD-619 041 Div. 31/5
CFSTI Prices: HC$3.00 MF$0.75

Webb Inst. of Naval Architecture, Glen Cove, N. Y.
RESEARCH ON TRENDS OF WAVE BENDING MOMENT FOR DESTROYER-TYPE SHIPS,
by Robert B. Zubaly and Roger H. Compton.
Jun 65, 93p
Contract NObs90293, Projs. SF013 03 01, W14, Task 2032
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Hydrodynamics, Destroyers), (*Destroyers, Hydrodynamics), Model tests, Sea water, Moments, Deflection, Mathematical prediction, Programming-(Computers).

Results are presented of a study of comparative trends of wave-induced midship bending moments for destroyer-type ship forms in realistic short-crested irregular seas. Wave-induced bending moments to be expected at sea are predicted by means of the method of linear superposition and statistical analysis of the resulting response spectra. Calculations are based on available systematic model test results in regular waves and available sea spectral data. Variations in non-dimensional wave bending moment coefficients and in effective wave heights are presented graphically as functions of ship size, ship speed, ship heading, ship fullness, and severity of the sea. The results of the statistical investigation of wave-induced bending moments in average North Atlantic weather are plotted as predicted trends of non-dimensional wave bending moment coefficients versus number of wave cycles (i.e. length of time at sea). Conclusions are drawn regarding implications of results for longitudinal strength design standards and recommendations are made for further research. (Author)

AD-619 128 Div. 26/4

Rutgers - The State Univ., New Brunswick, N. J.
Statistics Center.
SOME NEW CHAIN SAMPLING INSPECTION PLANS,
by H. F. Dodge and K. S. Stephens. May 65, 12p
Contract Nonr40418, Projs. NR042 241, RR003 05 01
Unclassified report

Research done in cooperation with Engineering Research Center, Western Electric Co. Rept. prepared for presentation to ASQC Technical Conference, Los Angeles, Calif., May 65. Pub. in Technical Conference Transactions, American Society for Quality Control p8-17 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Quality control, Statistical analysis), (*Statistical analysis, Quality control), (*Sampling, Quality control), Stochastic processes, Operations research.

This paper outlines the structure of a generalized family of chain sampling inspection plans, extending the concepts used in the 'Chain Sampling Inspection Plan ChSP-1' published by Dodge (1955). Expressions are derived for the OC curves for three general sets of '2-stage' chain sampling plans, with cumulative acceptance numbers of 0,1; 0,2; and 1,2 respectively - ChSP-1 uses only 0,1 and with a stated limiting rule of cumulation. The OC curves for a number of plans are given, and comparisons are made with some single sampling and double sampling plans. (Author)

AD-619 195 Div. 31/5, 30/5
CFSTI Prices: HC$2.00 MF$0.50

David Taylor Model Basin, Washington, D. C.
CALCULATED NATURAL FREQUENCIES AND NORMAL MODES OF VIBRATION ON RANGE INSTRUMENTATION SHIP (T-AGM-19).
Acoustics and vibration lab. research and development rept.,
by Robert L. Perkins. Jun 65, 26p
Rept. no. 1997
Unclassified report

Descriptors: (*Marine engineering, System test vessels), (*System test vessels, Calibration), (*Ships-(Nonmilitary), System test vessels), Ship hulls, Vibration, Tankers, Ranges(Establishments), Instrumentation, Digital computers, Analog computers, Mathematical analysis.

Normal modes and natural frequencies of vibration were calculated for the hull of the Range Instrumentation Ship (T-AGM-19), a T-2 tanker conversion for NASA. Nine vertical, six horizontal, six torsional, and five coupled torsion-horizontal modes and their natural frequencies are presented. Parameters used in the calculations by a digital computer and an electric analog computer are given. Calculations were performed for the ship in full load condition. The response of the hull to a sinusoidal vertical force acting at the stern was calculated using damping values of 0.01 mu omega and 0.03 mu omega ton-sec/sq ft. The effect of rotary inertia and shear, and flexural rigidity on natural frequencies of vertical and horizontal vibration was also calculated. Rotary inertia had very little effect on the frequencies. Shear and flexural rigidity had a large effect on the frequencies, particularly at frequencies above the first mode of vibration. (Author)

AD-619 267 Div. 13/5, 25/2
CFSTI Prices: HC$1.00 MF$0.50

Westinghouse Research Labs., Pittsburgh, Pa.
Insulation and Chemical Technology Dept.
ANISOTROPIC LIQUIDS FOR TUNNEL DETECTION.
Letter rept. no. 1 for period ending 15 Aug 65,
by L. C. Flowers and R. H. Calderwood.
15 Aug 65, 6p
Contract AF08 635 5262, ARPA Order 563
Unclassified report

Descriptors: (*Liquids, Anisotropy), (*Anisotropy, Liquids), (*Underground structures, Monitors), (*Monitors, Underground structures), Identification, Soils, Thermal radiation, Films, Temperature, Surface properties, Stability, Thermoplastics, Crystals.

The program is split into two parts: (1) determination

of limiting conditions under which heat sources can be detected, and (2) design of field detection systems. Among the limiting conditions to be explored in Part 1 are: (a) depth of void cover (e.g., soil overlay) above the tunnel; (b) surface temperature gradient between void cover and adjacent areas; (c) sensitivity of anisotropic liquids required; and (d) stability of anisotropic liquids. Part 2 envisages the following considerations: (a) investigation of materials for containing anisotropic liquids; (b) optimization of unit surface coverage; and (c) evaluation of serial versus random distribution of individual anisotropic liquids. (Author)

AD-619 269 Div. 31/5, 31/3
CFSTI Prices: HC$1.00 MF$0.50

Department of Defense, Washington, D. C.
THE FISHING FLEET AND FISHING TECHNIQUE: THE FISHING REFRIGERATOR TRAWLER TROPIC,
by N. E. Bozisov. 1965, 12p
TT 65-62902
Unclassified report

Trans. of Rybnoe Khozyaistvo (USSR) v38 n8 p32-41 1962.

Descriptors: (*Ships(Nonmilitary), USSR), Ship hulls, Ship structural components, Engines + motors, Electrical equipment, Refrigeration systems, Hoists, Fishes.

AD-619 276 Div. 26/6, 25/6
CFSTI Prices: HC$2.00 MF$0.50

SKF Industries, Inc., King of Prussia, Pa. Engineering and Research Center.
A BASIC STUDY OF THE SLIDING CONTACTS IN ROLLING BEARINGS.
Progress rept. no. 1 for 17 Apr-16 Jul 65,
by C. J. Belsky, J. I. McCool, and J. Tataiah.
16 Jul 65, 50p Rept. no. AL65L054
Contract NOw65 0182f, Projs. 2, 18-7
Unclassified report

See also AD-617 735.

Descriptors: (*Roller bearings, Mechanics), (*Friction, Roller bearings), Loading(Mechanics), Temperature, Motion, Statistical analysis, Surface properties, Tests, Data.

Temperatures near the contact between the two balls on the two-ball tester were determined experimentally using a miniature thermocouple attached to the stationary ball. Results from temperature measurements during sliding experiments in the two-ball configuration with Esso Primol 355 lubricant indicate that the temperature just prior to smearing is nearly speed independent for speeds in the 500 to 2500 rpm range. The estimated contact area temperatures range from 101C to 113C, based on extrapolation from the experimental temperature mapping. Temperatures extrapolated using a theoretical temperature distribution are somewhat higher. A flat washer-to-roller tester has been selected; set-up and tests of the kinematic behavior of rollers between two flat washers have started. This configuration will be used to determine how the critical conditions for smearing found in Phase I are generated in a typical rolling bearing assembly. Roller skew and axial position data were processed for several positions around the circumference of both an aligned and an intentionally misaligned cylindrical roller bearing.

AD-619 296 Div. 11/4, 30/3
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., Schenectady, N. Y. Advanced Technology Labs.
DESIGN AND FABRICATION OF A FULL-SCALE, LIMITED-MOTION PEDIPULATOR.
Final rept. for Apr-Nov 64,
by R. S. Mosher. Jun 65, 43p
Rept. nos. 65-46004-1, ATL-65035
Contract DA36 034AMC0268T, Proj. 1V021701A045, Task AMCMS5022.11.822
Unclassified report

Descriptors: (*Vehicles, Feasibility studies), (*Remote control systems, Performance(Human)), (*Systems engineering, Vehicles), (*Control systems, Vehicles), Legs, Joints(Physiology), Servomechanisms, Adaptive control systems, Design, Motion, Human engineering.

This report describes the design and fabrication of a full-scale, limited-motion pedipulator. This experimental equipment was needed to determine whether man and machine could be integrated so that man's sense of balance and natural corrective action would regulate balance of the man-machine system. A limited amount of operational experience with the machine shows that man can indeed balance the machine, the control response and other characteristics are adequate, and further psychophysical testing on the machine is desirable. (Author)

AD-619 300 Div. 13/11, 18/1, 13/10
CFSTI Prices: HC$4.00 MF$1.00

Bio-Dynamics, Inc., Cambridge, Mass.
A DISASTER PLANNING MANUAL FOR SMALL COMMUNITIES.
Final rept.,
by D. B. Haswell, D. W. Williams, and T. J. Cummings.
15 Apr 65, 147p
Contract OCD PS64 39
Unclassified report

Descriptors: (*Disasters, Urban planning), (*Urban planning, Disasters), (*Fire safety, Urban planning), Civil defense systems, Hazards, Nuclear warfare, Meteorological phenomena, Water supplies, Public health, Police, Management planning, Personnel management, Damage, Control, Handbooks.

The manual was prepared as part of the study of community fire-fighting capabilities. It describes a method and organization by which existing municipal services (fire, police, public works, medical, civil defense, etc.) can be integrated for an expanded capability to contend with major fires and associated contingencies. The majority of the recommendations are based on methods used successfully in the development of municipal disaster organizations. The manual is representative of a type that might be used by fire chiefs--personnel at the operating level. Basic elements of planning for combat of major fires are: assessment of special local hazards, knowledge of nuclear and extreme meteorological effects, organization of a disaster management team from municipal departments, developing a plan for integrated activity, mobilizing latent community resources (both personnel and equipment), and conducting periodic trials and exercises. The essential ingredient for success is having professional, experienced personnel in control positions and a clear definition of the organization. The manual describes planning for fire operations, including access, emergency resources, communications, logistics, and other vital tasks required for damage control. (Author)

AD-619 319 Div. 26/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
STABILIZATION OF ARC BURNING PROCESS (AC-ARC) AT ARGON-ARC WELDING OF STRUCTURAL

STEEL,
by A. G. Simonik. 28 Jul 65, 9p
Rept. no. FTD-TT-65-536
TT 65-62924

Unclassified report

Unedited rough draft trans. of *Svarochnoe Proizvodstvo (USSR) n3 p29-30 1965.

Descriptors: (*Arc welding, Steel), (*Electric arcs, Stabilization), USSR, Alternating current, Argon, Oxidation, Welding rods, Welds, Oxygen, Controlled atmospheres.

Data are presented on the stabilization of arc burning process of an AC arc of industrial higher frequency by chemical oxidation of basic metal and filler wire, and also by adding oxygen to the argon. (Author)

AD-619 333 Div. 26/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
SPOT WELDING OF NIOBIUM,
by V. L. Grishin and A. D. Grishina. 4 Aug 65, 7p Rept. no. FTD-TT-65-613
TT 65-62939

Unclassified report

Edited trans. of Tsvetnye Metally (USSR) v37 n10 p67-8 1964.

Descriptors: (*Niobium, Spot welding), (*Spot welding Niobium), USSR, Welds, Sheets, Electrodes, Cooling, Tungsten, Cadmium alloys, Copper alloys, Microstructure, Hardness.

AD-619 343 Div. 13/4
CFSTI Prices: HC$1.00 MF$0.50

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
CONTINUITY IN FOUNDATION MODELS AND RELATED PROBLEMS,
by Arnold D. Kerr. Jun 65, 20p
Research rept. 109
Proj. 1V0250001A13001

Unclassified report

Descriptors: (*Foundations(Structures), Polar regions), (*Civil engineering, Foundations(Structures)), Elasticity, Load distribution, Viscoelasticity, Snow, Permafrost, Models(Simulations).

The present paper contains a critical study of a number of foundation models suggested by various investigators, as well as a further development of some ideas involved. It is found that the model by Pasternak is the most natural extension of the Winkler foundation. It is also shown that the "nonsolvability" of the problem of a finite beam or plate resting on a continuous foundation as posed by Wieghardt and further elaborated by Pflanz is not correct, and that problems of this type are solvable for any load distribution permissible in classical plate theory. The paper concludes with derivations of differential equations for plates resting on viscous and viscoelastic foundations, which may be used for solving problems involving compacted snow and permafrost bases. (Author)

AD-619 361 Div. 13/4

Virginia Polytechnic Inst. Blacksburg.
WIND LOADS ON BASIC DOME SHAPES,
by F. J. Maher. 1965, 11p
Contract DA31 124AROD150
AROD 4448:2

Unclassified report

Pub. in Journal of the Structural Division, Proceedings of the American Society of Civil Engineers v91 nST3 p219-28 Jun 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Roofs, Aerodynamic loading), (*Structural shells, Aerodynamic loading), (*Gust loads, Structures), Hemispherical shells, Stresses, Wind, Laminar boundary layer, Wind tunnels, Wind tunnel models, Pressure, Tests.

Test data are presented for wind load distribution on hemispheres and domes, where the models were placed on the floor of the wind tunnel in a boundary layer flow. Three hemispheres tests were conducted. Two tests were made on hemispheres of different size with different Reynold's numbers and differing relationship to the boundary layer; both models were spun and lightly polished. A third hemisphere test was made with an artificially roughened surface. Four domes (spun and lightly polished) of varying span to rise ratio were also tested. The results are presented in the form of pressure coefficient contour maps of the surface. (Author)

AD-619 374 Div. 26/1, 14/2, 18/2, 17/1
CFSTI Prices: HC$2.00 MF$0.50

Beryllium Corp., Reading, Pa.
PRODUCTION ENGINEERING MEASURE FOR BERYLLIUM OXIDE AND PARTS PRODUCED FROM IMPORTED ORES.
Quarterly progress rept. no. 7, 1 Jan-31 Mar 65,
by J. F. Blum and H. F. Lebo. 31 Mar 65, 44p
Contract DA36 039AMC01481E

Unclassified report

See also AD-615 412.

Descriptors: (*Ceramic materials, Electronic equipment), (*Beryllium compounds, Oxides), (*Electronic equipment, Ceramic materials), (*Powder metallurgy, Mechanical working), Manufacturing methods, Sulfates, Hydrates, Powders, Particle size, Density, Sintering, Ores(Metal sources), Electrical properties, Thermal conductivity, Fracture(Mechanics), Extrusion.

Four uniform powder batches were prepared in the pilot plant using processes developed for this contract. The powder batches met all tentative specifications. A fabrication mix was prepared from each powder batch. The mixes met all chemical and physical property specifications. Test specimens were produced from each powder batch using pressing conditions, green densities, and firing schedules approximating conditions that will be employed to produce the final parts for the contract. The final specimen sizes and property measurements were as per MIL-I-10A requirements. Dielectric constant and loss factor values measured at one megacycle, met required specifications. Flexural strength values met required specifications. Thermal conductivity results at 100F and 280F were equal to or greater than proposed specifications set earlier for quality BeO ceramics. (Author)

14. Methods and Equipment

AD-618 888 Div. 30/4, 12/1, 12/3
CFSTI Prices: HC$12.65 MF$4.00

RAND Corp., Santa Monica, Calif.
OPERATIONAL CRITERIA FOR THE DESIGN OF MISSILE READINESS TESTING PROGRAMS AND EQUIPMENT; APPENDIX C,
by Joseph R. Brom and Sidney I. Firstman. 1962, 965p Memo. no. RM-2735, app-C
Unclassified report

Available only for Reference use at DDC Field Services. Copy is not available for public sale.

Descriptors: (*Guided missiles, Test equipment), (*Maintenance equipment, Design), Ground support equipment, Test sets, Launching sites, Test facilities, Effectiveness, Military requirements, Reentry vehicles, Guidance, Control systems, Electronic equipment, Electrical equipment, Reliability, Reliability(Electronics), Test methods, Malfunctions, Tables.

This appendix to AD-268 940 presents the results of the high-speed machine computations. A comprehensive list is provided of P(sub i j k)s (the probability that a function is operative and ready for launch at any future time) as a function of a range of the input parameters. The appendix is divided into three sections, titled: Periodic Check, Continuous Monitor, and Leave Alone.

AD-618 892 Div. 30/5, 26/2, 32/4
CFSTI Prices: HC$3.00 MF$0.75

Research Analysis Corp., McLean, Va.
GUIDE FOR REVIEWERS OF STUDIES CONTAINING COST-EFFECTIVENESS ANALYSIS,
by I. Heymont, O. Bryk, H. Linstone, and J. Surmeier. Jul 65, 77p Rept. no. RAC-S-IR-240
Unclassified report

Descriptors: (*Costs, Effectiveness), Armed forces procurement, Military requirements, Mathematical models, Analysis.

Contents:
General background: Cost effective analysis and the estimate of the situation; essential elements: objectives; alternatives; cost; models; criteria; role of judgment; review of studies
Key questions (designed to focus the reviewer's attention on selected aspects to assist him in an evaluation): Statement of the problem; assumptions; alternatives; documentation and data; cost; relationships (models); effectiveness; criteria; conclusions and recommendations
Glossary
Selected questions.

AD-618 957 Div. 30/4
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
SOME LIMITATIONS OF AUTOMATIC TEST EQUIPMENT,
by Sidney I. Firstman. 22 May 61, 8p
Rept. no. P-2319
Unclassified report

Presented as part of panel on automatic test equipment sponsored by the Professional Group on Human Factors in Electronics of IRE, Los Angeles, Calif., 22 May 61.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Test equipment, Feasibility studies), Automatic, Test equipment(Electronics), Human engineering, Test methods, Tests.

Four categories of automatic test equipment (ATE) limitations are discussed: those surrounding automatic testing per se, those most closely associated with ATE-prime equipment interactions, those associated with the ATE operating in its environment, and those concerned primarily with man-machine activities.

AD-618 999 Div. 30/5, 9/1, 14/8, 14/9, 29/2

Lockheed Missiles and Space Co., Palo Alto, Calif. Research Labs.
MECHANICAL SHEAR RELAXATION SPECTROSCOPY IN EXPERIMENTAL VISCOELASTICITY,
by D. O. Miles, G. C. Knollman, A. S. Hamamoto, and G. C. Norstrom. 11 Nov 64, 17p
Unclassified report

Pub. in Journal of Applied Polymer Science v9 p2209-25 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Viscoelasticity, Spectroscopy), (*Polymers, Viscoelasticity), (*Liquids, Viscoelasticity), Polyethylene plastics, Elastomers, Composite materials, Colloids, Solutions, Food, Ultrasonic radiation, Shear stresses, Relaxation time, Entropy.

The applicability of experimental viscoelastic techniques involving sinusoidal mechanical shear is examined for several types of rheological systems. Data are first presented for NBS polyisobutylene to establish validity for the approach used. General categories that are investigated include elastomers, filled systems, pure liquids, slurries, or suspensions, solutions and gels, foodstuffs, and polymer melts. A modification of the familiar time-temperature superposition routine is proposed by which both entropy and energy relaxation processes can be treated for liquids and polymers alike. (Author)

AD-619 017 Div. 30/4, 25/1, 22/13
CFSTI Prices: HC$2.00 MF$0.50

Naval Ordnance Test Station, China Lake, Calif.
TRANSDUCER CALIBRATION FACILITY AT MORRIS DAM,
by Udene E. Younger. Jul 65, 49p
Rept. no. NOTS-TP-3844
Tasks R36R IN307 2161F0990303, RUTO3E000 216 1F008 03 01
NAVWEPS 8762
Unclassified report

Descriptors: (*Electroacoustic transducers, Calibration), Underwater sound equipment, Underwater sound signals, Sound transmission, Sensitivity, Acoustic impedance, Frequency, Physics laboratories.

The transducer calibration facility at the NOTS Morris Dam test area, near Azusa, Calif., includes special mounting apparatus for positioning and rotating transducers under water. The facility is instrumented for the following capabilities: (1) transmitting and receiving sensitivities of transducers can be measured over the frequency range 8 cps to 150 kc; (2) directivity patterns can be plotted automatically, using a motor-driven

transducer rotator and a synchronized polar recorder, over the frequency range 20 cps to 150 kc; (3) the resistive and reactive components of transducer impedance can be measured over the frequency range 20 cps to about 30 kc; at higher frequencies, the total impedance may be obtained from voltage and current measurements. With this facility, needed types of specialized calibration information can be obtained quickly, thus facilitating development work. Basic principles and scientific background are discussed in this report, which also includes brief descriptions of methods of measurement and data forms. (Author)

AD-619 038 Div. 30/3, 17/4
CFSTI Prices: HC$3.00 MF$0.75

Hoskins Mfg. Co., Detroit, Mich.
STUDY OF HIGH TEMPERATURE THERMOCOUPLES.
Final rept. for 1 Jun 63-15 Dec 64,
by B. Forrest Hall, Jr. and Norman F. Spooner.
23 Mar 65, 91p
Contract AF19 628 2957, Proj. 5621, Task 562101
AFCRL 65-251
Unclassified report

Descriptors: (*Thermocouples, High-temperature research), Graphite, Thermoelectricity, Electric wire, Microstructure, Furnaces, Barometric pressure, Tungsten, Rhenium, Tungsten compounds, Carbides, Carbon, Argon, Hydrogen, Hydrocarbons, Gases, Tungsten alloys, Rhenium alloys.

Materials suitable for use as components of thermocouples for temperature measurement in a graphite environment were investigated. The performance of the W/W26%/Re thermocouple was evaluated up to 2500C in the presence of graphite under different atmospheric conditions. Thermoelectric effects were associated with carbon-metal reactions as revealed by metallographic studies or test materials. The behavior of the thermocouple was found to be directly dependent on the carburizing potential of the atmosphere surrounding the wires. Temperature indications were found to be reliable within at least ±2% for up to 100 hours at 2400C in argon at atmospheric pressure in a graphite furnace. However, reducing the pressure or replacing the argon with hydrogen or a hydrocarbon gas caused a decrease in the thermocouple output as a function of time and temperature. This was interpreted as the formation of intermediate junctions of Tungsten: Tungsten Carbide and Tungsten-26% Rhenium: Tungsten Carbide in the respective wires. Several thermocouple prototypes were constructed and were found to have features that could be useful in thermocouples for a graphite environment. (Author)

AD-619 052 Div. 30/3, 8/1, 8/3
CFSTI Prices: HC$3.00 MF$0.75

Navy Electronics Lab., San Diego, Calif.
SYNCHRO-TO-TAPE-TO-SYNCHRO CONVERTER.
Research and development rept. for Apr 64-Jan 65,
by J. Marez and R. A. Turner. 21 May 65, 62p
Rept. no. NEL-1289
Proj. SS191 003, Tasks 6013, NEL N40351
Unclassified report

Descriptors: (*Synchros, Magnetic tape), (*Magnetic tape, Synchros), Radar antennas, Radar signals, Azimuth, Coding, Real time.

The problem: Design and develop an equipment that will encode synchro data into a form suitable for recording on magnetic tape, and that will also accept the encoded signals during playback and convert them to the original synchro form. Results: A synchro-to-tape-to-synchro (STSC) converter has been developed. It provides a simple and reliable means of recording radar antenna azimuth synchro data for reproduction at a later time, or for real time encoding and decoding of synchro signals. The input-output processing accuracy is within ±0.5 degree. The STSC unit works well with a 15-kc/s-bandwidth recording medium. It operates in only one direction, and its incremental output is 0.357 degree (1008 steps per revolution). During the playback mode of operation, the STSC will detect magnetic tape dropouts or false data and correct itself accordingly. (Author)

AD-619 174 Div. 30/6
CFSTI Prices: HC$3.00 MF$0.75

Massachusetts Inst. of Tech., Cambridge. Aerophysics Lab.
RECENT ADVANCES IN THE DEVELOPMENT OF A MAGNETIC SUSPENSION AND BALANCE SYSTEM FOR WIND TUNNELS (PART III).
Annual summary rept. for Jan-Oct 64,
by Alan B. Copeland, Eugene E. Covert, and Timothy Stephens. Jun 65, 52p Rept. no. TR-96
Contract AF33 615 1470, Proj. 7065, Task 706508
ARL 65-114
Unclassified report

See also AD-437 969.

Descriptors: (*Wind tunnels, Instrumentation), (*Balances, Wind tunnels), (*Suspension devices, Wind tunnels), Wind tunnel models, Stability, Tests, Roll, Control, Hypersonic wind tunnels.

The report presents a discussion of the recent development work on a magnetic model suspension and balance system. System equipment additions and modifications are described. Wind tunnel test data is presented. A summary of work done on dynamic stability testing with the magnetic balance is given. Studies on roll control, a digital position measuring system, and magnetic model configuration are discussed. A summary of the design of a magnetic suspension and balance system for the twenty-inch hypersonic tunnel is included. (Author)

AD-619 210 Div. 30/5, 30/3, 25/2, 25/4, 4/2, 4/3
CFSTI Prices: HC$1.00 MF$0.50

Polytechnic Inst. of Brooklyn, N. Y.
DEVELOPMENT OF NEW INSTRUMENTATION AND TECHNIQUES IN X-RAY DIFFRACTION.
Final rept. for Oct 47-Jan 63,
by I. Fankuchen. Jul 65, 5p
Contract Nonr83913, Proj. NRO17 604
Unclassified report

Descriptors: (*X-ray diffraction analysis, Low-temperature research), (*Crystal structure, X-ray diffraction analysis), X-ray diffraction cameras, Organic compounds, Single crystals, Powders, Phase studies.

This Project had as its original objectives the development of new instrumentation and techniques in x-ray diffraction and the improvement of existing techniques in that field. Early work on the Project was concentrated on instrumentation for x-rays, including a microcamera and monochromator. In recent years emphasis was shifted to, or was concentrated on, the development of low-temperature x-ray diffraction methods and on studies carried out at low temperatures. Simple and convenient techniques for x-ray single crystal and powder studies at low temperatures, developed on this Project, are now widely used. The crystal structures of various liquids

and gases were studied at low temperatures, and detailed analyses were made of low-temperature phase transformation in various organic crystals.

AD-619 271 Div. 30/6
CFSTI Prices: HC$2.00 MF$0.50

Massachusetts Inst. of Tech., Cambridge. Aerophysics Lab.
THE DESIGN OF MAGNETIC MODELS FOR USE IN A MAGNETIC SUSPENSION AND BALANCE SYSTEM FOR WIND TUNNELS,
by Alan B. Copeland and Edward L. Tilton, III.
Jun 65, 34p
Contract AF33 615 1470, Proj. 7065, Task 706508
ARL 65-113

Unclassified report

Descriptors: (*Wind tunnels, Instrumentation), (*Balances, Magnetic materials), (*Wind tunnel models, Supersonic devices), (*Suspension devices, Magnetic materials), Aerodynamic loading, Design, Magnetic fields, Supports, Optimization, Aerodynamic configurations.

The report discusses the design of the magnetic portion or core of a model for use in a magnetic suspension system for wind tunnels. The calculation of the forces obtainable with a given suspension system and model, and the optimization of model core geometry and material are discussed. An example of the design of a model core is presented. (Author)

AD-619 292 Div. 26/1, 25/2, 14/7
CFSTI Prices: HC$1.00 MF$0.50

Cast Inst. of Tech., Celeveland, Ohio.
DEPOSITION OF CARBON ON DIAMOND SEED CRYSTALS.
Scientific rept. no. 1, 1 Jan-30 Jun 65,
by John C. Angus. 2 Jul 65, 13p
Contract AF19 628 4785, Proj. 5621, Task 562103
AFCRL 65-497

Unclassified report

Descriptors: (*Vapor plating, Carbon), (*Diamonds, Vapor plating), Hydrocarbons, Chemical equilibrium, Crystals, Gas flow.

The experimental apparatus for the vapor deposition of carbon on diamond seed crystals has been constructed, leak tested, and the flow systems calibrated. Initial deposition of carbon, not on diamond substrates, has been accomplished. The computer programming for solution of the equilibrium compositions in high temperature hydrocarbon systems has been completed. The relative flow rates of H2 and CH4 to obtain low carbon supersaturations have been computed for several experimental regimes of interest. (Author)

AD-619 316 Div. 30/3, 8/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
AUTOMATIC SYSTEM FOR RECORDING THE AMPLITUDE AND PHASE CHARACTERISTICS OF DIAGRAMS OF ANTENNA DIRECTIONALITY,
by I. N. Kuligin and I. K. Fadeev. 28 Jul 65, 5p
Rept. no. FTD-TT-65-499
TT 65-62921

Unclassified report

Unedited rough draft trans. of Russian Patent 163224, pub. 3 Jul 62, appl. 784909/26-9.

Descriptors: (*Electronic recording systems, Radio signals), Patents, USSR, Phase measurement, Radio-frequency power, Automatic, Ultrahigh frequency, Seromotors, Attenuators, Phase control devices, Antenna, Antenna radiation patterns.

The object of the invention is an automatic device for recording the amplitude and phase characteristics of directionality diagrams of antennas designed in accordance with the system of different channels of measurable and reference signals. Simultaneous measurement of amplitudes and phases of the currents of UFH with high precision is assured by the use of slave motors and an attenuator connected with them of the limiting type with little initial attenuation. A broad-band UHF phase converter is used for the automatic maintaining on the input of the receiver of a constant amplitude of the measurable UHF signal and difference of phase between the reference and the measurable UHF signals. A servo system is used for measuring the independent coordinate and the displacement of the tape. The tape simultaneously records the amplitude and phase diagrams of the directionality of the antennas.

AD-619 354 Div. 30/3, 2/7

Parametrics, Inc., Waltham Mass.
A PARTIAL EVALUATION OF THE PERFORMANCE OF AN ALUMINUM OXIDE HUMIDITY ELEMENT.
Scientific rept.,
by David Chleck and Frederick J. Brousaides. 1964,
15p Rept. no. SR-1
Contract AF19 628 2449, Proj. 6670, Task 667001
AFCRL 65-365

Unclassified report

Pub. in Electric Hygrometry p405-14 1964
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Hygrometers, Aluminum compounds), (*Aluminum compounds, Oxides), Performance-(Engineering), Dew point, Water vapor, Meteorological instruments.

The performance of aluminum oxide humidity elements is described. Elements were examined using a bridge circuit having an impedance related readout. Sensitivity to water vapor concentrations ranging from ambient conditions to dew points as low as -90C was found. The element senses absolute vapor concentration and the steady-state response is independent of the total gas pressure. Within experimental error, no temperature correction was found necessary over the range of +25 to -80C. The time response of the element is rapid. The 1 -1/e (63 per cent) change was found to occur within 2 1/2 seconds. The common air pollutants, ozone, nitrogen dioxide and sulfur dioxide, have no effect upon element response. Elements re-examined after periods up to a month have not drifted out of calibration. Long-term stability and aging characteristics have yet to be determined. (Author)

AD-619 385 Div. 30/3
CFSTI Prices: HC$2.00 MF$0.50

Rock Island Arsenal, Ill.
A STUDY OF INNOVATIONS OF SALT SPRAY (FOG) TESTING EQUIPMENT.
Technical rept.,
by Jacob Knanishu. May 65, 26p
Rept. no. RIA-65-1191
Proj. 1C024401A110

Unclassified report

Descriptors: (*Test equipment, Salt spray tests),

(*Salt spray tests, Test equipment), Performance-(Engineering), Fog, Spray, Salts, Solutions, Corrosion, Environmental tests.

Tests were conducted to compare the 'regular type' (ASTM Designation B117-54T) salt spray cabinet using the conventional salt solution aspiration mechanism with the new Fog Dispersion Tower Conversion Kit means of salt-fog emission. Tests indicated that better fog distribution and less consumption of solution result from the use of the conversion tower type equipment. Collection rate data obtained by placing collection funnels at certain positions, or stations, proved this to be true. The ASTM designated (B117-54T) equipment sometimes fails to complete a full week-end of operation (64 hours), while the Conversion Tower-Type apparatus operates for 96 hours or more before the solution supply is exhausted. It was found that practically no reduction of the quantity or quality of the 'fog' (in the collection graduates) resulted as the solution level in the supply tank decreased. (Author)

15. Military Sciences

AD-618 707 Div. 18/7
CFSTI Prices: HC$3.00 MF$0.75

Dunlap and Associates, Inc., Darien, Conn.
MAN-COMPUTER INTERACTIONS IN IDEALIZED TACTICAL PROBLEM SOLVING.
Final rept.,
by U. O. Gagliardi, R. A. Hussey, I. T. Kaplan, and R. J. Matteis. May 65, 92p
Contract Nonr360200

Unclassified report

Descriptors: (*Tactical warfare, Decision theory), (*Ballistic missile submarines, Targets), Performance(Human), Computers, Automatic, Command + control systems, Programming(Computers).

The aim of this research was to develop a method for the design of automated problem-solving aids. The approach taken was to examine human performance for evidence of inadequate heuristic procedures indicating processing overloads which could be eliminated by appropriate automated procedures. The problems used were selected because they have a formal structure which admits many interpretations--from the design of minimal switching circuits to the disposition of weapon systems. The subject's task was to allocate hypothetical missile-firing submarines so that a specified number of targets was covered, by the fewest possible ships. This task could be formulated as a linear integer programming problem which was solvable by Gomory's algorithm. However, complete automation of the task, using this algorithm, was undesirable, because the procedure was excessively time-consuming when more than a few solutions were required. Experiments indicated that the subject's processing limitations resulted in a slow and biased search for elements from which to assemble solutions. The aided system delegated the subtask of finding key elements to an automated process and let the person assemble these elements into deployments. The effectiveness of this arrangement was shown by the fact that aided subjects found more and more uniformly distributed solutions than unaided subjects.

AD-618 711 Div. 18/1, 13/11, 30/5
CFSTI Prices: HC$4.00 MF$0.75

IIT Research Inst., Chicago, Ill. Technology Center.
FIRE STORM ENVIRONMENTAL MODEL.
Final summary rept.,
by Hugo J. Nielsen. Apr 65, 110p
Contract OCD PS64 50, Proj. IITRI-N6062

Unclassified report

Descriptors: (*Fires, Environmental-tests), (*Fluid mechanics, Fires), Models(Simulations), Convection), Momentum, Energy, Meteorological phenomena.

To further define the environment within a fire storm, an analytical model was developed which describes the conditions of flow and temperature of the fluid. In the model, the fire is considered to be an area on the ground with a temperature above that of the surroundings. The motion of the fluid produced by the temperature excess was obtained by solution of the equations of energy, motion and continuity by a numerical integration technique. Effects of viscosity and of thermal conduction are included in the analysis without the boundary layer approximations that were used in a previous analyses of the convection column. For this reason, the results obtained in the region near the ground are not subject to the deficiencies of those of the previous analysis. Some of the effects of swirling flow are also included in the model by specification of rotation in the surrounding air. A simplified analysis was also conducted to estimate the time required for the development of swirl flow. In the analysis, the entrainment by a convection column is represented by a line sink. A simple solution is presented for rate of growth of swirl flow for a fluid initially rotating at a speed that corresponds to the rotation of the earth. (Author)

AD-619 158 Div. 18/3, 26/7, 33/1
CFSTI Prices: HC$5.00 MF$1.00

Little (Arthur D.) Inc., Cambridge, Mass.
DESIGN CRITERIA, TECHNICAL CHARACTERISTICS, AND DESIGN CONCEPTS FOR AN AIR TRANSPORTABLE CONTAINER.
Final rept.,
by Charles W. Wood, John H. Watts, and Robert M. Lucas. Jun 65, 173p Rept. no. C-66529
Contract DA44 177AMC210T, Task 1M643324D59808
AAML 65-36

Unclassified report

Descriptors: (*Containers, Air transportation), (*Packaging, Army equipment), Feasibility studies, Cargo, Design, Costs, Effectiveness, Handling, Logistics.

The report presents the results of a study to determine the feasibility of containerization for Army resupply items. The study has been limited to air transportation of supply classes I through IV shipped from a point of origin in the United States to an overseas forward area. Container criteria for size, weight, cost, strength, effectiveness and general characteristics were developed. Then the design criteria were used as the basis for evaluating the stability of various materials and conceptual container designs. An acceptable container design appears to be feasible. (Author)

AD-619 203 Div. 18/3, 32/8, 32/4
CFSTI Prices: HC$1.00 MF$0.50

National Resource Evaluation Center, Washington, D. C.
NATIONAL RESOURCE EVALUATION CENTER OBJECTIVES.
31 Jul 64, 15p

Unclassified report

Descriptors: (*Economics, Management planning), (*United States Government, Economics), Electronic equipment, Mathematical models, Systems engineering, Warfare, Mobilization.

The National Resource Evaluation Program is organized and directed by the Office of Emergency Planning. The program capitalizes on recent developments in electronic equipment, mathematical model building, and systems analysis and applies them to tasks of rapid and intensive analysis of the U. S. economy for purposes of emergency planning and resource management. This report lists (1) objectives of the Center for fiscal years 1965 through 1969, (2) statement of achievement toward objectives during fiscal year 1964, and (3) the specific program objectives for fiscal years 1965 and 1966.

AD-619 204 Div. 18/1, 26/2
CFSTI Prices: HC$1.00 MF$0.50

National Resource Evaluation Center, Washington, D. C.

NREC'S EXPANDING CAPABILITIES TO SUPPORT RESOURCE MANAGEMENT.
13 Jul 65, 10p

Unclassified report

Descriptors: (*Nuclear warfare, Recovery), (*Management planning, Civil defense systems), (*Civil defense systems, Industrial production), United States, Vulnerability, Survival.

A review was made of the past development of National Resource Evaluation Center's capabilities with emphasis upon four analytical systems, namely: (1) A damage assessment system. (2) A hazard analysis system. (3) A supply-requirement analysis system pertaining to survival items, and (4) A prototype post-attack program development system. A program was described for familiarizing OEP and other personnel with this prototype post-attack program development system (PARM). Plans were reviewed for new inter-industry models, including: (1) The Recovery Model now in development by NPA. (2) A National Economic Strength Model initiated in NREC with NPA assistance. (3) A Regionalized Model which will be started next fiscal year, if funds are available. Plans were reviewed for development of statistical projection models. A description was given of certain facets of the National Resource Evaluation Program which, in an emergency, would support federal field activities and which would facilitate the flow and assimilation of reports from the field. (Author)

16. Missile Technology

AD-618 740 Div. 12/1
CFSTI Prices: HC$2.00 MF$0.50

Lockheed Missiles and Space Co., Sunnyvale, Calif.
STRESS AND STABILITY ANALYSIS OF CYLINDRICAL AND CONICAL SHELLS. VOLUME I. AN INFINITESIMAL-BUCKLING ANALYSIS FOR TRUNCATED CONICAL SHELLS SUBJECTED TO EXTERNAL PRESSURE.
Final technical rept., vol. 1,
by E. V. Pittner and F. G. Morton. 31 May 61, 47p
Rept. no. LMSD-894808, vol. 1
Contract NOrd18780FBM, Task 2
Unclassified report

Descriptors: (*Conical bodies, Structural shells), (*Guided missiles, Stresses), (*Structural shells, Buckling(Mechanics)), Cylindrical bodies, Loading-(Mechanics), Stability, Hydrostatic pressure, Numerical analysis, Strain(Mechanics).

An approximate energy analysis for determining the buckling load of a thin truncated conical shell under combined axial compression and external lateral pressure is presented. Numerical examples based on the present theory are given for cones subjected to hydrostatic pressure. Calculated buckling pressures for this loading are compared with results of other analyses and of recent tests. Results of the present analysis are in close agreement with these tests and with certain of the other analyses. (Author)

AD-618 741 Div. 12/1
CFSTI Prices: HC$2.00 MF$0.50

Lockheed Missiles and Space Co., Sunnyvale, Calif.
STRESS AND STABILITY ANALYSIS OF CYLINDRICAL AND CONICAL SHELLS: VOLUME II. A METHOD OF ANALYSIS FOR BUCKLING OF MONOCOQUE CONICAL SHELLS SUBJECTED TO HYDROSTATIC PRESSURE.
Final technical rept., vol. 2,
by E. V. Pittner and F. G. Morton. 31 May 61, 44p
Rept. no. LMSD-894808, vol. 2
Contract NOrd18780FBM, Task 2
Unclassified report

See also AD-618 740.

Descriptors: (*Conical bodies, Structural shells), (*Guided missiles, Stresses), (*Structural shells, Hydrostatic pressure), (*Monocoques, Buckling(Mechanics)), Loading(Mechanics), Numerical analysis, Stability, Cylindrical bodies.

A simple, approximate method of analysis for the buckling of a thin-walled conical shell subjected to external hydrostatic pressure is presented for use in stress analysis. Based on an application of the concept of an equivalent cylinder, design curves are given covering the whole range of taper ratios from 0 (a cylinder) to 1 (a complete cone). Recent tests of cones under hydrostatic pressure are also described. The results of these tests and all other available test data on this subject are presented in tabular form. The agreement between the suggested method of analysis and the test data is shown to be reasonably close for the complete range of design parameters investigated. (Author)

AD-618 742 Div. 12/1
CFSTI Prices: HC$3.00 MF$0.75

Lockheed Missiles and Space Co., Sunnyvale, Calif.
STRESS AND STABILITY ANALYSIS OF CYLINDRICAL AND CONICAL SHELLS. VOLUME III. AN EXPERIMENTAL INVESTIGATION OF THE STRESS IN CYLINDRICAL SHELLS SUBJECTED TO SMALL PAD LOADS.
Final technical rept.,
by F. G. Morton and D. O. Brush. 31 May 61, 76p
Rept. no. LMSD-894808
Contract NOrd 18780FBM, Task 2
Unclassified report

Descriptors: (*Cylindrical bodies, Structural shells), (*Guided missiles, Stresses), (*Structural shells, Stresses), Conical bodies, Cylindrical bodies, Loading-(Mechanics), Stability, Strain gages, Rubber, Pneumatic devices, Tables, Analysis.

The report contains results of an experimental investigation to determine the stresses in a thin-walled cylindrical shell subjected to a radial load applied by a small, rectangular pad. Four loading devices are studies: 3 rubber-lined pad configurations, 1 pneumatic bag, constrained to apply a load over a rectangular area. There is sufficient duplication of test parameters to check repeatability of results. The test results show rather close agreement with available theoretical values. (Author)

AD-618 743 Div. 12/1
CFSTI Prices: HC$3.00 MF$0.75

Lockheed Missiles and Space Co., Sunnyvale, Calif.
STRESS AND STABILITY ANALYSIS OF CYLINDRICAL AND CONICAL SHELLS. VOLUME IV. RESPONSE OF THIN-WALLED CYLINDRICAL SHELLS TO SADDLE-TYPE LOADS.
Final technical rept.,
by D. O. Brush and F. G. Morton. 31 May 61, 74p
Rept. no. LMSD-894808
Contract NOrd18780FBM, Task 2
Unclassified report

See also AD-618 742.

Descriptors: (*Cylindrical bodies, Structural shells), (*Guided missiles, Stresses), (*Structural shells, Loading(Mechanics)), Conical bodies, Stability, Buckling(Mechanics), Strain gages, Failure(Mechanics), Analysis.

Results are presented of an experimental investigation of unstiffened, thin-walled cylindrical shells subjected to a transverse load applied by a cushioned saddle. The cylinders were supported at the ends and the saddle load applied at midspan. Prebuckling stresses, buckling mode, and buckling load were investigated. All of the test cylinders failed in a mode that is characteristic of unstiffened cylindrical shell failure under local circumferential stresses. The only independent variable investigated in the test series was the stiffness of the saddle liner material. The liner stiffness was found to have a strong influence on the magnitude of the buckling load, with stiffer liners resulting in higher buckling loads. (Author)

AD-618 783 Div. 16/2, 2/5

Arctic Inst. of North America, Washington, D. C.
THE PRESENCE OF BACTERIA IN PERMAFROST OF THE ALASKAN ARCTIC,
by William L. Boyd and Josephine W. Boyd.
16 Jul 64, 6p Rept. no. ONR-300(01)
Contract Nonr113801, Proj. NR307 105
Unclassified report

Pub. in Canadian Journal of Microbiology v10 p917-9 1964 (Copies available only to DDC users)
Prepared in cooperation with Colorado State Univ., Fort Collins.

Descriptors: (*Bacteria, Permafrost), (*Permafrost, Bacteria), Half life, Viability, Spores, Collecting methods, Culture media, Arctic regions, Alaska.

The possible occurrence of viable microbes and other forms of life in permanently frozen material has intrigued microbioligists for many years. If present, these may well be the oldest living things on this planet, having survived over a long period of time under frozen conditions. Because of the difficulties of sampling through permanently frozen ground and due to logistics and other problems of methodology, only few studies on the mocrobial flora of permafrost have been made. To extend these studies and to include quantitative studies of the Alaskan Arctic, a series of holes 32 in. in diameter were drilled to depths of 8-15 ft. in permafrost along a traverse between Elson Lagoon and the village of Barrow. Samples were collected from the wall of the hole for analysis. Throughout the depth of the soil section the number of thermophilic bacteria was more or less constant; markedly fewer mesophilic forms were observed in the permafrost than in the active layer. In general, molds were restricted to the upper 6 in. of the soil and psychrophilic bacteria to the upper 12 in. During this work, many colonies of the thermophilic bacteria were isolated and examined, and almost all were able to produce spores. The question of age of these soil bacteria could only be answered by radiocarbon dating. (Author)

17. Navigation, Communications, Detection, and Countermeasures

AD-618 836 Div. 6/5, 2/1, 25/4

Oxford Univ. (England). Dept. of Astrophysics.
AN IMAGE-SCRAMBLER FOR USE WITH A PHOTOMULTIPLIER,
by D. E. Blackwell, A. D. Petford, and S. H. McCrea.
1964, 3p

Unclassified report

Pub. in Observatory v85 n944 p21-3 Feb 1965. (Copies available only to DDC users).

Descriptors: (*Optical instruments, Photomultipliers), (*Photomultipliers, Optical equipment components), Images, Deformation, Astronomy, Great Britain.

An image scrambler (i.e., a device which completely destroys the structure of an image) is described which helps overcome some of the difficulties involved in astronomical photometry. It is expressly designed for use with a photomultiplier which has an end-on cathode.

AD-618 874 Div. 19/4
CFSTI Prices: HC$7.00 MF$1.75

Foreign Technology Div., Wright-Patterson AFB, Ohio.
FLOATING GYROSCOPES AND THEIR APPLICATIONS,
by G. A. Slomyanskii and Yu. N. Pryadilov.
Aug 60, 339p Rept. no. F-TS-9910/V
TT 61-13612

Unclassified report

Trans. of mono. Poplavkovye Giroskopy i Ikh Primeneniye, Moscow, 1958, 244p.

Descriptors: (*Gyro stabilizers, Flight control systems), Gyroscopes, Aircraft, Guided missile components, Position finding, Guidance, Mechanics, Inertial navigation, USSR.

This volume presents a brief survey of the fundamental properties of gyroscopes and their use for the purpose of determining the orientation of a given object (an aircraft, guided missile, etc.) with respect to a certain system of coordinates, which may be fixed or rotating in space in a prescribed manner; the type designations and capabilities of typical differentiating and integrating gyroscopes are examined. Detailed consideration is given to the design, theory, and analytical procedures applied to floating differentiating and integrating gyroscopes, and to certain problems attendant upon their application. The volume contains data pertaining to American floating gyroscopes. The physical bases for inertial navigation systems are outlined briefly. The book is intended for use by engineers working in the field of gyro-mechanism engineering, and may also prove useful to students in the instrument-engineering specialties. (Soviet publisher's announcement)

AD-618 893 Div. 19/4, 1/1
CFSTI Prices: HC$4.00 MF$1.00

Instrumentation Lab., Mass. Inst. of Tech., Cambridge.
INERTIAL NAVIGATION STUDY FOR CIVIL AIR TRANSPORT.
Phase 1.
Mar 65, 136p Rept. no. R-484
Contract FA64WA 5127, Proj. 116 11N
SRDS RD-65-36

Unclassified report

Descriptors: (*Inertial navigation, Civil aviation), (*Civil aviation, Air transportation), Systems engineering, Performance(Engineering), Flight instruments, Aviation safety, Air traffic control systems, Transport planes, Inertial guidance.

The application of inertial navigation and guidance systems to civil air transport operations from the systems engineering viewpoint is developed. The concept of an operational system for navigation and guidance is introduced to facilitate consideration of the relationships which will exist between the inertial system and the operating functions necessary for the conduct of a flight. Inertial system configurations satisfying the requirements implied by these relationships are presented. The general requirements for input data panels and system output displays for all flight phases are discussed. Several basic navigation system mechanizations are analyzed and the general characteristics of a recommended configuration for an integrated navigation and guidance system described. The report also includes an estimate of the system performance required for the various flight phases. (Author)

AD-618 907 Div. 5/2, 12/1
CFSTI Prices: HC$3.00 MF$0.75

Sylvania Electronic Systems, Williamsville, N. Y.
TRANSPORTABLE SATELLITE COMMUNICATIONS TERMINAL X-BAND RECEIVING FACILITY.
Final technical rept. for Mar 64-Mar 65,
by Robert McIntyre. Jun 65, 99p
Contract AF30 602 3333, Proj. 4519, Task 451901
RADC TR-65-144

Unclassified report

Descriptors: (*Radio receivers, X band), (*Communication equipment, Radio receivers), Portable, Phase-locked systems, Parametric amplifiers, Multiplex, Frequency shift keyers, Demodulators, Frequency, Feedback, Global communication systems, Space communication systems.

This report describes the effort expended on the design, development, installation and testing of a X-band receiving facility for the Transportable Satellite Communications Terminal. The prime objective of this program was to provide the required demodulation capability for voice, frequency multiplex and frequency shift keyed signals to be generated during future Air Force test programs. The equipment resulting from this program includes a phased lock demodulator assembly which is used for frequency multiplex signals requiring a modulation index of one and a frequency feedback demodulator assembly which is used for a voice channel requiring a modulation index of 20. The designed demodulators provide an extension of the FM threshold over conventional frequency demodulation techniques, by approximately 4 db for the phase lock demodulator and by 7.2 db for the frequency feedback demodulator. The total receiving facility supplies a system noise temperature of 295 K over a tuning range of 7.69 to 7.79 gc and features automatic lock and tracking for signals having doppler frequency shifts of less than ± 250 kc. (Author)

AD-618 935 Div. 6/6, 17/4, 12/6
CFSTI Prices: HC$1.00 MF$0.50

Army Materials Research Agency, Watertown, Mass.
A PROTECTIVE COATING SYSTEM FOR A TZM ALLOY RE-ENTRY VEHICLE.

Technical rept.,
by Milton Levy. Jul 65, 21p Rept. no. AMRA-TR-65-19
Proj. DA1C024401A110, Task 36351
Unclassified report

Descriptors: (*Guided missile detection, Radar targets), (*Metal coatings, Heat-resistant metals + alloys), (*Heat-resistant metals + alloys, Reentry vehicles), (*Reentry vehicles, Heat-resistant metals + alloys), Electroplating, Titanium alloys, Zirconium alloys, Molybdenum alloys, Chromium alloys, Nickel alloys, Antimissile defense systems, Tracking, Nose cones.

An electroplated coating system was developed to protect a TZM molybdenum alloy (5% Ti, 0.08% Zr) re-entry vehicle from oxidation at high temperatures. The coating system, comprised of an undercoating of 0.0005 inch chromium, an intermediate coating of 0.001 inch nickel, and an outer coating of 0.0005 inch chromium, was adherent, oxidation resistant and thermal-shock resistant compatible with AMRAD TARGET Experiment requirements. (Author)

AD-619 033 Div. 6/5
CFSTI Prices: HC$3.00 MF$0.75

RAND Corp., Santa Monica, Calif.
THE PROBABILITY OF VISUAL DETECTION OF RECONNAISSANCE AIRCRAFT BY GROUND OBSERVERS,
by D. J. Dugas. Jun 65, 67p
Memo no. RM-4562-PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Reconnaissance planes, Tracking), Visibility, Low altitude, Flight speeds, Target discrimination, Atmosphere, Sky brightness, Vision, Probability, Mathematical analysis, Graphics.

An investigation was made of the ability of ground observers, unaided by optical or electronic devices, to detect visually each of six reconnaissance aircraft. Calculations are made for a variety of conditions, in altitudes, speeds, and visibilities. Among several conclusions are: (1) the probability of visual detection falls off rapidly as aircraft altitude is decreased below 2000 ft; (2) increasing speed is an effective way to reduce detectability; (3) contrast is a critical factor in determining detectability but is difficult to predict or control. (Author)

AD-619 068 Div. 6/1, 14/6, 31/5
CFSTI Prices: HC$1.00 MF$0.50

Goodrich (B. F.) Aerospace and Defense Products, Akron, Ohio.
PRESSURIZED BOW DOME OF A CABLE-REINFORCED RUBBER CONSTRUCTION FOR USE WITH AN/SQS-26 SONAR,
Monthly summary rept. for 30 Apr-31 May 1965,
by W. J. Berus. 31 May 65, 17p Rept. no. R-27
Contract NObsr89483, Proj. SS041 001, Task 8156
Unclassified report

See also AD-610 189.

Descriptors: (*Sonar domes, Composite materials), (*Rubber, Sonar domes), (*Cables(Mechanical), Reinforcing materials), Sonar, Aging(Materials), Ship hulls, Joining, Pressure.

The aft port and starboard window sections have been completed, x-rayed and found to be acceptable for use. The four window sections have been installed on the Hydrostatic Test Fixture. The three (3) splices have been fabricated and cured; however, the starboard and nose will require recure operations. The prototype test panel is successfully continuing on the 60 day, 40 psi stand test.

AD-619 082 Div. 6/3, 26/4
CFSTI Prices: HC$3.00 MF$0.75

Santa Barbara Research Center, Goleta, Calif.
PRODUCTION ENGINEERING MEASURE: PbSe INFRARED DETECTOR, TYPE IR-200.
Quarterly progress rept. no. 7, 1 Jul 64-31 May 65,
by G. H. Cook. 10 Aug 65, 64p
Contract DA36 039AMC01466K
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
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See also AD-604 186.

Descriptors: (*Infrared detectors, Manufacturing methods), (*Photoelectric cells(Semiconductor), Infrared detectors), Quality control, Lead alloys, Selenium alloys, Production, Performance(Engineering).

Twelve preproduction units were fabricated, tested, and approved. There were no fabrication problems. Only insignificant test problems were encountered and these are explained. (Author)

AD-619 086 Div. 6/3, 25/4, 26/4
CFSTI Prices: HC$1.00 MF$0.50

Philco Corp., Lansdale, Pa. Lansdale Div.
PEM FOR GOLD-DOPED GERMANIUM INFRARED DETECTOR TYPE IR400.
Quarterly progress rept. no. 9, 1 Jan-31 Mar 65,
by A. Guimento. 31 Mar 65, 17p
Contract DA36 039AMC01464E, Proj. H200
Unclassified report

See also AD-612 960.

Descriptors: (*Infrared detectors, Manufacturing methods), (*Germanium, Infrared detectors), Gold, Impurities, Environmental tests.

Additional preproduction samples were fabricated, environmental test procedure was modified, preproduction testing was completed and approved, and the pilot production phase of the contrct was started. (Author)

AD-619 087 Div. 6/6, 8/3
CFSTI Prices: HC$6.00 MF$1.50

IIT Research Inst., Chicago, Ill.
ELECTRONIC EQUIPMENT CHARACTERISTICS-RADAR TYPES.
Rept. no. 4 (Final), 15 Feb 64-15 Apr 65,
by B. Ebstein, J. J. Krstansky, P. McManamon, I. N. Mindel, and R. D. Standley. 15 Apr 65, 278p
Contract DA2o 043AMC00004E, Proj. 1G6 20501D449 01
Unclassified report

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Copy is available for public sale.
See also AD-603 639.

Descriptors: (*Radar equipment, Army equipment),

(*Radar interference, Measurement), Radar equipment, Radar antennas, Antenna radiation patterns, Radar, Radar tracking, Superhigh frequency, Radones, Test equipment(Electronics).

The objectives of this program were to establish measurement procedures for defining the interference characteristics of U.S. Army radar equipments. The work has been reported in three main sections dealing with antenna measurement techniques, transmitter measurements and advanced measurement techniques. The discussion of antenna measurement techniques includes studies of the M-33 acquisition radar antenna, multimode effects, instrumentation and measurement procedures, ground effects on antenna pattern measurements and far field measurements in the Fresnel Zone. The discussion of transmitter measurements includes presentation of the Pattern Integration Techniques and insertion loss of the M-33 radar. The discussion of advanced measurement techniques deals with the problems of interference measurements of tracking radars. The presentation includes a review of the data requirements for tracking radar interference prediction and analysis of monopulse; pulse doppler and CW-FM radar systems. (Author)

AD-619 090 Div. 5/2
CFSTI Prices: HC$1.00 MF$0.50

Lockheed Missiles and Space Co., Sunnyvale, Calif.
RADIO PAGE SYSTEM.
Final proj. rept.,
by J. E. Boehm and L. W. Haire. Aug 65, 23p
Rept. no. LMSC-A622845
Unclassified report

Descriptors: (*Industrial plants, Intercommunication systems), (*Intercommunication systems, Industrial plants), (*Radio communication systems, Industrial plants), Radio equipment, Procurement, Costs, Reliability.

In developing and installing the LMSC Radio Paging System, Office Operations achieved its principal objective, to provide at low cost the means by which selective personnel can be located on short notice with effective results. A rapidly rising usage curve has already exceeded the 7,000 page calls per month mark. Unique electronic hardware, developed for this system, has patent applications pending, and is providing another source of revenue to the company by means of a licensing agreement with the supplier who is making the product available to the nation-wide market. The present gross savings rate of $657,000 per annum was achieved incidental to the principal objective of this entire undertaking. Not only can the in-plant traveler be reached expeditiously, but at a cost far less than normal business requirements dictate. Lastly, the continual drone of public address paging has been reduced from well over 1,000 per day to approximately 75 per day, and those in only two buildings in the complex. In addition, the company has recovered the use of the public address system for its normally intended purpose -- all employee announcements and emergency or disaster control. From LMSC's standpoint the project has proved to be well worthwhile. (Author)

AD-619 160 Div. 19/3, 6/6
CFSTI Prices: HC$3.00 MF$0.75

Raytheon Co., Wayland, Mass.
TV MOSAIC DISPLAY GENERATOR GROUP.
Final rept.,
by C. A. Berner. Jun 65, 74p
Contract FA WA4671, Proj. 104 126D
SRDS RD-65-51
Unclassified report

Descriptors: (*Television display systems, Air traffic control systems), (*Display systems, Radar equipment), Plan position indicators, Radar images, Viewing screens, Vidicons, Scanning, Analog-to-digital converters, Delay circuits, Video signals.

A developmental television mosaic display generator for the National Airspace System is described. The optimum coverage portions of eight air traffic control radars are combined into a composite picture covering a large surveillance area. Ten air traffic controllers may view any portion of the mosaic area with a movable display 'window.' Input data to the system is radar video which has been scan-converted from PPI to 945-line television. Gray level photographic slides are used with television cameras in a video blanking generator to select scan-converted radar video for inclusion in the mosaic. Timing for the system is generated by a digital master synchronizer which is fully compatible with existing RBDE-5 equipment. Improved air traffic control methods are developed using the TV mosaic to advance the safe and efficient movement of air vehicles in the Nation's airspace. (Author)

AD-619 213 Div. 5/5
CFSTI Prices: HC$2.00 MF$0.50

Scripps Institution of Oceanography, Univ. of California, La Jolla.
DEVELOPMENT OF A COLORED TELETYPE TAPE DISCRIMINATION SYSTEM.
Final rept.,
by R. L. Ensminger. Sep 64, 32p
Rept. no. SIO-Ref-64-12
Contract NObs84075, Proj. SF01802, Task 0538
Unclassified report

See also AD-600 912.

Descriptors: (*Teletype systems, Monitors), Secret communication systems, Tapes, Colors, Colorimetry, Photoelectric materials, Phototubes, Optical scanning, Optical filters, Classification, Reading machines, Typewriters.

In some types of Navy teletype communications installations, messages in the form of paper tapes are fed into one tape reader for transmission if unclassified material, and into a separate tape reader for encoding and transmission if classified. The Bureau of Ships is investigating a system of color coding of paper tapes as a technique for safeguarding against unintentional transmission of classified information on the unclassified equipment. The Visibility Laboratory previously constructed a laboratory breadboard of a photoelectric apparatus capable of sensing the color of the paper tape and disabling the tape reader in the presence of tape of the wrong color (AD-600 912). The present report describes the design and construction of an operational breadboard unit for mounting on the AN/UGC-6 teletypewriter.

AD-619 222 Div. 5/2, 12/1, 30/4
CFSTI Prices: HC$2.00 MF$0.50

Rome Air Development Center, Griffiss AFB, N. Y.
RADC TRINIDAD-ROME SATELLITE COMMUNICATION LINK.
Final rept.,
by Rodney C. Pratt. Jun 65, 49p
Rept. no. RADC-TR-65-217
Proj. 4519, Task 451901
Unclassified report

Descriptors: (*Space communication systems, Communi-

cation satellites(Passive)), (*Communication satellites-(Passive), Test facilities), Radio ranges, West Indies, New York, Communication equipment, Radio receivers, Radio transmitters, Parabolic antennas, Multiplex, Radio transmission, Ionospheric propagation, Tracking, S band.

This report describes the facilities at Rome and Trinidad which are used to perform communication experiments using the Echo type satellites. These facilities have undergone many modifications over the past five years and this report describes the facility as it presently exists. The Rome and Trinidad facilities provide a duplex communication link when used with passive satellites. The communication for this link is accomplished at S band while tracking at Trinidad is dependent upon a 427 mc radar set. There have been some unique developments in providing this capability with work continuing on a high power dual frequency feed. The Trinidad facility will be closed down by 30 June 1965 but the Floyd facility will be retained for future work. (Author)

AD-619 275 Div. 6/5
CFSTI Prices: HC$5.00 MF$1.00

Human Sciences Research, Inc., McLean, Va.
RESEARCH ON VISUAL TARGET DETECTION. PART I. DEVELOPMENT OF AN AIR-TO-GROUND DETECTION/IDENTIFICATION MODEL,
by Margaret E. Franklin and John A. Whittenburg.
Jun 65, 166p Rept. no. HSR-RR-65/4-Dt
Contract DA31 124ARO D287, Proj. 1R1203ODO35
Unclassified report

Descriptors: (*Target recognition, Air-to-surface), (*Target discrimination, Mathematical models), Terrain, Aircraft, Visual inspection, Velocity, Ranges(Distance).

The object was to develop a simple, operational model for predicting air-to-ground visual detection/identification of tactical targets. The model, based on data from the literature, was limited to conditions of daylight and clear visibility. A preliminary model was developed using data from a field study (J.A. Whittenburg, J. P. Robinson and J. M. Hesson. Aerial observer criterion field test manual. Arlington, Va., Human Sciences Research, Inc., Sept. 1959. HSR-RR-59/4-CE) of air-to-ground detection/identification of tactical targets. Variables to be included in the model were selected from a list of variables found to be important in previous studies. The model includes estimates of eight input variables--target size, target shape, target/ground contrast, clutter, terrain type, aircraft altitude, aircraft speed, and range--which were grouped into three composite variables (target apparent size, target distinctiveness, and effective exposure time). A numerial summary of relevant studies on target detection/identification and a description of model calculations are presented as appendices. (Author)

AD-619 287 Div. 5/6, 8/4
CFSTI Prices: HC$1.00 MF$0.50

Hanovia Lamp Div., Engelhard Industries, Inc., Newark, N. J.
IMPROVEMENT OF COMMUNICATION ARC LAMPS FOR VISIBLE AND INFRARED SIGNALLING EQUIPMENT.
Quarterly progress rept. no. 1, 6 Jan-30 Jun 65,
by O. E. Lienhard. 30 Jun 65, 6p
Contract NObsr93090, Proj. SF0060502, Task 7006
Unclassified report.

Descriptors: (*Signal lights, Electric arcs), Infrared beacons, Xenon, Mercury, Light communication systems, Infrared communication systems.

Work done toward improving communication arc lamps for visible and infrared signalling equipment is summarized.

AD-619 299 Div. 19/3
CFSTI Prices: HC$5.00 MF$1.25

Lear Siegler, Inc., Grand Rapids, Mich. Instrument Div.
HYPERBOLIC COORDINATE CONVERTER.
Final rept.,
by W. F. Roth, A. R. VanKoevering, and D. Wozniak.
Jan 65, 179p Rept. no. GRR-65-1023
Contract FA WA4659, Proj. 116 8
SRDS RD-65-3
Unclassified report

Descriptors: (*Hyperbolic navigation, Navigation computers), (*Navigation computers, Hyperbolic navigation), (*Digital computers, Navigation computers), (*Loran equipment, Navigation computers), Airborne, Flight testing, Radio navigation, Radio receivers, Trigonometry, Equations.

The hyperbolic coordinate converter converts the time difference outputs of the radio receiver into the conventional latitude-longitude coordinates; and from the present position coordinates, calculates and displays the distance, bearing, and bearing error to a preselected destination along a preselected course. The development and construction of an airborne, digital, navigation computer for solving the coordinate conversion problem was proven as a result of an explicit solution to the coordinate conversion problem and some unique computing algorithms for solving trigonometric equations. The mechanization of the computer was a major breakthrough in digital computers and is now called DIVIC for DIgital Variable Increment Computer. The hyperbolic coordinate converter interfaced with an SPN-30 Loran-C Receiving Set was flight tested over the Loran-C East Coast chain. (Author)

18. Nuclear Science and Technology

AD-618 922 Div. 20/6, 20/2
CFSTI Prices: HC$4.00 MF$0.75

Oak Ridge National Lab., Tenn.
FAST-NEUTRON SCATTERING FROM SMALL CYLINDERS OF STEEL, ALUMINUM, AND GRAPHITE, by John C. Courtney. Jul 65, 106p
Rept. no. ORNL-TM-1156
Unclassified report

Supported in part by Army Nuclear Defense Lab., Edgewood Arsenal, Md., order NDL-23-63.

Descriptors: (*Shielding, Neutron scattering), (*Fast neutrons, Neutron scattering), (*Neutron scattering, Measurement), (*Steel, Neutron scattering), (*Aluminum, Neutron scattering), (*Graphite, Neutron scattering), Neutron spectrum, Neutron beams, Bremsstrahlung, Neutron detectors, Scintillation counters, Monte Carlo method, Neutron cross sections.

Time-of-flight methods were used to measure the spectra of fast neutrons scattered at angles of 20, 45, 70, 110, and 160 deg from the incident beam by small (2-in.-diam, 2.5-in.-high) cylinders of steel, aluminum, and graphite. The energy spectrum of the neutrons approximated a fission spectrum. Some of the neutrons struck the scattering sample, which was placed 13 in. from the source, passed through a system of collimators, down a drift tube, and into a liquid scintillator fast-neutron detector. Measured source spectra were used as input for Monte Carlo calculations of the scattered neutrons, and the results were compared with measured scattered spectral intensities. The calculations and experiments, integrated over energy, agreed within 16%. These comparisons indicate that the ORNL cross-section library for these elements is adequate to handle neutron scattering calculations. (Author)

AD-619 022 Div. 20/3, 14/2, 14/8, 14/6
CFSTI Prices: HC$1.00 MF$0.50

Radiation Effects Information Center, Columbus, Ohio.
MONTHLY ACCESSION LIST ABSTRACT NO. 27889 TO 27940, PART I.
Rept. for 1-31 Jul 65.
10 Aug 65, 24p REIC Accession List no. 89
Contract AF33 615 1124
Unclassified report

Continuation of Contract AF33 657 10085.

Descriptors: (*Materials, Radiation damage), (*Radiation damage, Materials), Metals, Ceramic materials, Organic materials, Polymers, Inorganic compounds, Electronic equipment, Space environmental conditions, Indexes, Bibliographies, Abstracting.

Contents: Abstracts: Metallic materials; Ceramic materials; Organic materials; Polymeric materials; Inorganic materials; Electronic materials, components, and devices; Facilities; Space environment and effects on materials; Experimental devices and techniques; Miscellaneous.

AD-619 023 Div. 20/3, 14/2, 14/8, 14/6
CFSTI Prices: HC$1.00 MF$0.50

Radiation Effects Information Center, Columbus, Ohio.
MONTHLY ACCESSION LIST COORDINATE INDEX, PART II.
Rept. for 1 Oct 64-31 Jul 65.
10 Aug 65, 14p
Unclassified report

Descriptors: (*Materials, Radiation damage), (*Radiation damage, Materials), Metals, Ceramic materials, Organic materials, Polymers, Inorganic compounds, Electronic equipment, Space environmental conditions, Dosimeters, Indexes.

The inverted concept-coordinate index is based upon terms generated in the REIC subject files and is cumulative throughout the year. The index is subdivided into two sections. The first, Radiation Environment, includes dosimetry and energy aspects of all electromagnetic and particulate radiation sources, with the exception of space radiation. Section two deals with materials, properties, secondary environment (including space environments), devices, and all other subject concepts.

19. Ordnance

AD-618 873 Div. 22/12, 5/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
OUTSIDE AND INTERIOR COMMUNICATION IN TANKS,
1964, 13p Rept. no. F-TS-7381-RE
TT 65-62807

Unclassified report

Trans. of Unidentified Russian Article.

Descriptors: (*Tanks(Combat vehicles), Radio communication systems), (*Radio communication systems, Tanks(Combat vehicles)), Intercommunication systems, Radio stations, USSR.

The translation of a portion of a treatise discusses mainly the principal aspects of radio communication and the manner by which such communication between combat tanks is achieved. Internal communication within a tank is principally by telephone network although light signals may be used as a reserve. The telephone intercommunication system can also be connected to the radio circuit.

AD-618 877 Div. 22/5, 15/1
CFSTI Prices: HC$5.00 MF$1.00

Naval Weapons Lab., Dahlgren, Va.
EXPECTED COVERAGE OF A CIRCULAR TARGET BY BOMBS ALL AIMED AT THE CENTER,
by M. P. Jarnagin, Jr. 30 Jun 65, 151p
Rept. no. NWL-1941

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Mathematical prediction, Target acquisition), (*Target acquisition, Mathematical prediction), Bombs, Targets, Damage, Programming(Computers).

The exact mathematical formulation is derived for the expected proportional coverage of a circular target from n weapons all aimed at the center of the target. It is assumed that the weapons fall in a circular normal distribution and that the lethal area of each weapon is a circle of specified radius (cookie-cutter lethality function). Tables are presented which are based on this formulation and which were computed on an IBM 7030 (STRETCH) computer. The computing time per case for coverages correct to two decimal digits is 0.25 to 0.50 seconds. (Author)

AD-618 897 Div. 13/10, 20/2
CFSTI Prices: HC$3.00 MF$0.75

Bartlesville Petroleum Research Center, Bureau of Mines, Okla.
PRESHOT AND POSTSHOT SAFETY SURVEY OF OIL AND GAS FACILITIES, BAXTERVILLE FIELD, MISSISSIPPI.
Final rept.,
by Don C. Ward. Jan 65, 68p
ARPA VUF-1022

Unclassified report

Rept. on Proj. DRIBBLE, SALMON EVENT, Tatum Salt Dome, Miss., 22 Oct 64.

Descriptors: (*Nuclear explosion damage, Structures), (*Structures, Nuclear explosion damage), Petroleum, Gases, Pipes, Photographs, Pumps, Tanks(Containers), Mississippi.

The preshot and postshot survey indicated that no damage occurred to any oil or gas well or related facility. Maximum values of ground shock recorded in the Baxterville field were well below those values at which structural damage to oilfield construction would be anticipated. It is concluded that, for future projects, no damage should result to similar structures from comparable yields at comparable ranges. Also, it is concluded that the survey procedures were adequate to accomplish the survey objectives. (Author)

AD-619 053 Div. 13/10
CFSTI Prices: HC$3.00 MF$0.75

Naval Civil Engineering Lab., Port Hueneme, Calif.
FEASIBILITY OF MODELING RUN-UP EFFECTS OF DISPERSIVE WATER WAVES,
Technical note,
by Jan M. Jordaan, Jr. May 65, 57p
Rept. no. TN-N-691
Projs. Y F008 08 02 129, DASA14 083

Unclassified report

Descriptors: (*Water waves, Ocean models), (*Underwater explosions, Nuclear explosions), (*Nuclear explosion damage, Structures), Feasibility studies, Beaches, Harbors, Scattering, Explosion effects, Mathematical prediction.

Studied were made in a laboratory test basin to determine the feasibility of modeling run-up effects of explosively generated water waves on beach and waterfront structures. Results were compared with (i) analytically derived predictions, and (ii) wave measurements (but not run-up) made in the ocean with high-energy (HE) explosives as the generating source. The test basin is 92 feet by 94 feet in size with 1:5, 1:13.6 and 1:5 sand beaches on three sides and on the fourth a 14-foot-diameter semi-paraboloidal plunger which by sudden plunge or retraction generates dispersive waves with dominant period of 2 seconds, height of 0.2 feet, and length of 20 feet in water 2-1/2 feet deep. It was found that wave motions are (i) predicted well by Green's Law, as modified for dispersive waves; and (ii) related to waves generated in the ocean by HE by the Froude scaling law. (Author)

AD-619 054 Div. 22/1, 9/1
CFSTI Prices: HC$2.00 MF$0.50

Frankford Arsenal, Philadelphia, Pa.
THE APPLICATION OF PURE FLUIDS TECHNOLOGY TO ARTILLERY FUZING.
Memorandum rept.,
by Robert A. Shaffer. May 65, 34p Rept. no. M65-20-1
Proj. 1C523801A295

Unclassified report

Descriptors: (*Time-delay fuzes, Fluid mechanics), (*Fluid mechanics, Fuze functioning elements), Packaging, Arming devices, Fuze setters, Control systems, Timing devices, Amplifiers, Artillary, Fluid flow.

The report reviews the requirements and operation of a conventional mechanical artillery fuze. A comparison is drawn between the conventional system and a proposed fluid equivalent system which utilizes a pure fluid (i. e., no moving parts) timer. The problems associated with packaging the fluid system components within a standard fuze contour are discussed and possible solutions to some of

the problems are indicated. A detailed discussion of the operation and system logic of a pure fluid, feasibility demonstration timer is presented. (Author)

AD-619 055 Div. 22/8, 28/2
CFSTI Prices: HC$1.00 MF$0.50

Frankford Arsenal, Philadelphia, Pa.
HUMAN FACTORS COMPARISON OF THREE TYPES OF SMALL ARMS SIGHTS.
Memorandum rept.,
by Daniel A. Triolo and Thomas G. Jadico.
May 65, 22p Rept. no. M65-21-1
Proj. 1C522301A080

Unclassified report

Descriptors: (*Gun sights, Small arms), (*Small arms, Gun sights), (*Human engineering, Gun sights), Focusing, Automatic weapons, Firing tests(Ordnance).

The report includes a description of the sights and weapons used, the type of lighting and target conditions, range, and the method used for testing. The problems of sight alignment with the short base reflecting tube sight are discussed. A short base reflecting tube sight containing cross hairs, and a short base open notch and blade sight were constructed and mounted on rifles. They were fired for score for a general comparison as against that of a conventional long base peep sight, and to determine which of the short base sights were more effective. Ten subjects fired the short base reflecting tube sight, the short base open notch and blade sight, and a conventional long base peep sight alternately for score under different lighting and target conditions. The extreme spread of the shot groups obtained with each sight and the sight and fire time for each round fired were measured and the data recorded. The conventional long base peep sight showed the best results. The subjects found it difficult to obtain sight alignment with the short base reflecting tube sight. The shot groups and firing times with the short base open notch and blade sight were significantly better than those obtained with the short base reflecting tube sight. (Author)

AD-619 206 Div. 22/6, 25/3
CFSTI Prices: HC$3.00 MF$0.75

Columbia Univ., New York. Plasma Lab.
NORMAL IONIZING SHOCK WAVES,
by R. Taussig. Jul 64, 57p
Rept. no. R-12
Contract AF49 638 1254

Unclassified report

Descriptors: (*Shock waves, Ionization), (*Ionization, Shock waves), Magnetohydrodynamics, Entropy, Continuum mechanics, Electromagnetic fields, Boundary value problems, Shock tubes, Detonation waves.

Solutions to the steady-state jump equations are obtained for a normal ionizing shock wave propagating into a non-conducting, quiescent gas in an electromagnetic field. Comparison of these solutions to pure MHD shocks and ordinary gas shocks indicates that ionizing shocks are hybrids having some properties common to both MHD and gas shocks. Some completely novel effects are produced by the upstream electromagnetic field. A modified Rankine-Hugoniot function is derived and used to select physically reasonable shock solutions. Solutions analogous in some respects to detonation-deflagration waves have been found, and the Chapman-Jouquet condition is applied to them. The complete boundary value problem is solved numerically in the context of an electromagnetic annular shock tube. Solution of the boundary value problem places the analytic results in the framework of experimentally observable phenomena and emphasizes the differences between ionizing shocks and MHD or gas shocks. (Author)

AD-619 241 Div. 13/10, 22/1, 22/6
CFSTI Prices: HC$4.00 MF$1.00

Naval Ordnance Test Station, China Lake, Calif.
EARTH-COVERED, STEEL-ARCH MAGAZINE TESTS.
Summary rept.,
by A. R. Sound. Jul 65, 149p
Rept. nos. TPR-401, NOTS-TP3843

Unclassified report

Descriptors: (*Underground structures, Blast), (*Storage, Explosive materials), Tests, Structural shells, Steel, Safety.

A series of tests of earth-covered, steel-arch igloo magazines was conducted to determine the minimum spacing distance between adjacent igloos needed to prevent the propagation of an explosion from one magazine to another. It was shown that the distance in feet between the side walls can be determined by multiplying the cube root of the stored explosive weight in pounds by the factor 1.25, and the distance between facing rear walls can be determined by using the factor 1.50.

AD-619 246 Div. 13/10, 25/6
CFSTI Prices: HC$3.00 MF$0.75

RAND Corp., Santa Monica, Calif.
ON THE EFFECTS OF STRESS-WAVE DIFFRACTION ON GROUND-SHOCK MEASUREMENTS: PART II,
by C. C. Mow and T. Repnau. Aug 65, 55p
Memo. no. RM4556-PR
Contract AF49 638 700

Unclassified report

Descriptors: (*Shock waves, Stresses), (*Underground structures, Shock waves), Mechanical waves, Loading-(Mechanics), Spheres, Elasticity, Velocity, Acceleration, Differential equations, Boundary layer, Motion, Measurement.

In a previous study (AD-610 337, On the Effects of Stress-Wave Diffraction of Ground-Shock Measurements: Part I), an exact solution for the response of a rigid spherical inclusion was determined. A few numerical examples were given, and results indicated tha the motions of the inclusion can be quite different from those of the free field. This Memorandum presents additional results on the effects of stress-wave diffraction on ground-shock measurements. An extensive parametric study is carried out in order to give useful numerical results for design purposes as well as to yield additional information for the general understanding of the response of an inclusion embedded in an elastic medium when subjected to stress-wave loading. Also investigated are some special instances when poles in the admittance function are of order 2 instead of just simple poles, and it is shown that they do not give rise to spurious effects. Finally, a method is given for the determination of free-field motion from the motion of the inclusion. (Author)

20. Physics

AD-618 689 Div. 25/4, 8/6
CFSTI Prices: HC$4.00 MF$1.00

Polytechnic Inst. of Brooklyn, N. Y., Microwave Research Inst.
DIFFRACTION AND SCATTERING OF ELECTROMAGNETIC WAVES IN ANISOTROPIC MEDIA.
Research rept.,
by Benjamin Rulf. 26 Apr 65, 137p
Rept. no. PIBMRI-1262-65
Contract AF19 628 2357, Proj. 5635, Task 563501
AFCRL 65-429
Unclassified report

Descriptors: (*Electromagnetic waves, Diffraction), (*Diffraction, Electromagnetic waves), Optics, Propagation, Scattering, Low frequency, High frequency, Electromagnetism, Dielectrics, Tensor analysis.

This study deals with several two-dimensional scattering and diffraction problems in anisotropic media. The intent is twofold: First, to generalize mathematical methods applicable in isotropic regions to a certain class of anisotropic problems; and Second, to study the solutions of the anisotropic problems in such a manner as to highlight certain common properties which point the way toward the construction of approximate solutions for configurations with more general structural shape or anisotropy. In the low-frequency range, the method of multipole expansion is used. It is demonstrated that the rigorous solution for the problem of scattering of a plane or cylindrical wave by an obstacle which is small compared to the wavelength may be expanded in a series whose terms correspond to multipole radiation in the anisotropic medium. As an illustration, the excitation coefficients of the first few terms arising from scattering by a narrow conducting ribbon are calculated. In the high frequency range, geometrical optics, the first-order asymptotic solution of Maxwell's equations is considered first. The ray refractive index is calculated, and the laws of propagation and reflection of rays, which define the trajectories of energy transport, are derived from Fermat's principle. To obtain an insight into diffraction phenomena, two types of representative problems -- -- diffraction by a straight edge, and diffraction by a smoothly curved object -- are discussed.

AD-618 691 Div. 25/7

Texaco Experiment, Inc., Richmond, Va.
THE ABSORPTION SPECTRUM OF NF2.
Technical rept.,
by P. L. Goodfriend and H. P. Woods. 26 Aug 63, 5p
Rept. nos. TP-208A, EXP-223
Contract Nonr188300 Unclassified report

Pub. in Journal of Molecular Spectroscopy v13 n1 p63-6 May 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Absorption spectrum, Fluorides), (*Fluorides, Nitrogen compounds), Molecular spectroscopy, Photochemistry, Band spectrum, Free radicals.

In the course of flash-photolysis kinetic-spectroscopy experiments on N-F containing compounds, it was found necessary to examine the absorption of the NF2 radical at 2600A reported by Johnson and Colburn. Johnson and Colburn, using a Beckman Model DK-1 recording spectrophotometer, were able to demonstrate that NF2 is responsible for this absorption but limited their description of the spectrum to the statement that it was a 'poorly structured band' with a 'maximum at 260 millimicrons with a 20-half-width.' Their primary use of this absorption has been to demonstrate the existence of the equilibrium of N2F4 and 2NF2 and to measure the equilibrium constant as a function of temperature. This communication reports a study of this absorption at a higher dispersion than that used by these authors. (Author)

AD-618 692 Div. 25/3
CFSTI Prices: HC$2.00 MF$0.50

Texas Univ., Austin. Dept. of Physics.
MEASUREMENT OF THE HALL EFFECT IN METAL-AMMONIA SOLUTIONS,
by D. S. Kyser and J. C. Thompson. 1964, 39p
Contract Nonr377400, Proj. NR017 457
Unclassified report

Descriptors: (*Hall effect, Measurement), (*Ammonia, Hall effect), Electrical conductance, Lithium, Sodium, Calcium, Solutions, Metals.

AD-618 693 Div. 25/3, 25/8
CFSTI Prices: HC$5.00 MF$1.25

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN INVESTIGATION OF A RADIO FREQUENCY GENERATED CYLINDRICAL PLASMA WITH ALKALI METAL INJECTION.
Technical rept. (Doctoral thesis)
by Daniel Washington Cheatham, Jr. 1965, 193p
Rept. no. TR-65-2 Unclassified report

Descriptors: (*Plasma medium, Electrical properties), (*Electrical properties, Plasma medium), (*Thermal properties, Plasma medium), Electromagnetic properties, Radiofrequency, Microwave frequency, Magnetohydrodynamics, Electrical conductance, Thermochemistry, Nitrogen, Alkali metals.

The thermochemical and electrical properties of a moderate temperature cylindrical plasma column were studied. The column consisted of a mixture of a low ionization potential alkali metal and a carrier gas heated by a radio frequency field to elevated temperatures and thus partially ionized. It was the purpose of this study to produce a suitable experimental model, analyze such a plasma theoretically, and measure the properties of the laboratory plasma for comparison with theory. The effect of low ionization potential seeding on plasma properties was of primary concern as was the applicability of various diagnostic techniques to this type plasma.

AD-618 709 Div. 25/4, 25/3, 25/2, 25/6, 8/3, 8/6
CFSTI Prices: HC$1.00 MF$0.50

Microwave Lab., Stanford Univ., Calif.
MICROWAVE RESEARCH.
Quarterly status rept. no. 25, 1 Feb-30 Apr 65. Jul 65, 14p Rept. no. ML-1351
Contract Nonr22548
Unclassified report

See also AD-614 099.

Descriptors: (*Microwave frequency, Scientific research), (*Acoustics, Amplifiers), (*Lasers, Scientific research), Piezoelectric crystals, Semiconductors, Interferometers, Phonons, Optics, Acoustics, Solid state physics, Electrons, Oscillation.

AD-618 712 Div. 25/7, 4/4
CFSTI Prices: HC$1.00 MF$0.50

Laboratory of Molecular Structure and Spectra, Univ. of Chicago, Ill.
LABORATORY OF MOLECULAR STRUCTURE AND SPECTRA QUARTERLY STATUS REPORT NO. 24.
Rept. for 1 Apr-30 Jun 65.
30 Jun 65, 9p
Contract DA11 022ORD3119, Projs. 5B51 02 044, 2955P
Unclassified report

See also AD-445 678.

Descriptors: (*Molecular structure, Theory), (*Molecular spectra, Mathematical analysis), (*Diatomic molecules, Molecular structure), (*Atomic structure, Theory), Programming(Computers), Atomic orbitals, Atomic energy levels, Numerical analysis, Field theory, Hydrides.

Summaries are given of research progress in the following areas: General atomic and molecular programming; calculations on atoms; Hartree-Fock calculations and the electronic structure of first row homonuclear diatomic molecules (A2), and first and second row diatomic hydride molecules (AH); one-center expansion SCF calculations; extended Hartree-Fock calculations.

AD-618 713 Div. 25/4
CFSTI Prices: HC$1.00 MF$0.50

Naval Research Lab., Washington, D. C.
ATMOSPHERIC NOISE POWER AVAILABLE AT THE OUTPUT OF AN ELEVATED RADIOMETER ANTENNA.
Memo. rept.,
by O. D. Sledge. Jun 65, 24p
Rept. no. NRL-MR-1619, rev.
Proj. RMWC42 1306521F0010501
Unclassified report

Descriptors: (*Radiometers, Calibration), (*Atmospherics, Thermal radiation), (*Thermal radiation, Atmospherics), Airborne, Antennas, Gain, Signal-to-noise ratio, Microwaves, Attenuation, Atmosphere, Infrared scanning, Mapping, Theory, Mathematical models.

Formulae are developed for the atmospheric noise power available at the output of an airborne radiometer antenna of narrow beamwidth. The theoretical model chosen for the antenna possesses characteristics which are fairly representative of the radiators met in practice. In a numerical example, in which the beam-depression angle is taken to be 30 degrees, the theory is applied to the calculation of the atmospheric path attenuation and the effective atmospheric noise-temperature of the elevated antenna for a number of frequencies and antenna heights. The path attenuation varies from 0.2 db at 5000 feet of altitude and a frequency of 35 gc to 1.7-2.5 db at heights of 30,000 feet or more and at frequencies of 80 to 100 gc. The effective noise-temperature of the antenna is 20 K at 10,000 feet altitude and at a frequency of 35 gc. As the frequency is elevated to 75 gc, the altitude remaining at 10,000 feet, the noise-temperature of the antenna increases to 80 K. (Author)

AD-618 724 Div. 25/3, 10/7, 10/1, 7/5
CFSTI Prices: HC$1.00 MF$0.50

Holman (John F.) Co., Inc., Washington, D. C.
COMBUSTION PRODUCTS PLASMA OF C2H2 + O2,
by Bronislav Grycz. Aug 65, 21p
Contract DA44 009AMC930T, Proj. 1C014 501B33A
AERDL T-1794-65, TT 65-62790 Unclassified report

Plasma Spalin C2H2 + O2. Trans. of Chekhoslovatskii Fizicheskii Zhurnal v14 p509-21 1964.

Descriptors: (*Magnetohydrodynamics, Combustion products), (*Combustion products, Plasma physics), (*Plasma medium, Combustion), (*Aliphatic compounds, Combustion products), Thermodynamics, Chemical equilibrium, Statistical analysis, Enthalpy, Density, Energy, Oxygen, Mixtures, Fuels, Ionization, Molecular weight, Czechoslovakia.

AD-618 725 Div. 25/6, 25/3, 7/5
CFSTI Prices: HC$3.00 MF$0.75

Holman (John F.) Co., Inc., Washington, D. C.
CONTRIBUTION TO THE THEORETICAL AND EXPERIMENTAL STUDY OF THE HALL EFFECT IN A ROTATING ELECTRIC FIELD.
Thesis,
by Robert Bonnefille. Aug 65, 71p
Contract DA44 009AMC930T, Proj. 1M643 324D589
AERDL T-1795-65, TT 65-62791
Unclassified report

Trans. of mono. Contribution a l'Etude Theorique et Experimentale de l'Effet Hall en Champ Electrique Tournant, Paris, Jun 25 1963 np. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Hall effect, Electric fields), (*Semiconductors, Hall effect), Rotation, Electrical impedance, Capacitance, Numerical analysis, Disks, Induction motors, France.

The purpose of the work is first to study the behavior of a semiconductor platelet in the presence of a rotating electric field (or potential distribution). It is shown that the Hall effect leads to the creation of an equivalent reactance independent of amplitude, and, to a large degree, of the frequency of the rotating field. This reactance, depending on the sense of rotation, is an inductive or capacitive reactance. One application of this property is automatic starting and speed regulation of a single phase induction motor. This motor has a generally fixed inductor, whose single phase winding, as supplied by an industrial distribution network, creates an ac sinusoidal magnetic field. It also has a rotor with a short circuited polyphase winding.

AD-618 733 Div. 9/4, 20/2, 20/7, 22/6
CFSTI Prices: HC$6.00 MF$1.50

Naval Ordnance Lab., White Oak, Md.
THE PHYSICS OF THE BASE SURGE.
Technical rept.,
by George A. Young. 17 Jun 65, 294p
Rept. no. NOLTR-64-103
Task FR70
Unclassified report

Descriptors: (*Underwater explosions, Nuclear explosions), (*Hydrodynamics, Underwater explosions), (*Nuclear explosions, Underwater explosions), (*Atomic clouds, Underwater explosions), Marine meteorology, Explosion effects, Radioactive fallout, Marine geophysics, Fluid mechanics, Mathematical models.

The column and base surges formed by the underwater nuclear explosion were measured in detail. The primary surge originated as a spillout of sea-water jets which broke into spray and formed a dense toroidal shaped cloud. Computations were made for the coalescence and rainout of drops and a theory was developed for the mixing of the

surge with the air. The late behavior was strongly influenced by the convectively unstable atmosphere and the high relative humidity.

AD-618 736 Div. 25/6, 8/2
CFSTI Prices: HC$4.00 MF$0.75

Motorola, Inc., Phoenix, Ariz. Semiconductor Products Div.
RESEARCH AND DEVELOPMENT FOR SEMICONDUCTOR SURFACE CONTROL AND STABILIZATION.
Final rept. for Nov 63-Feb 65,
by Ki Dong Kang, E. D. Metz, C. Lund, J. Adamic, and F. Lee. 14 Mar 65, 113p
Contract AF19 628 3808, Proj. 4608, Task 460805
AFCRL 65-361
Unclassified report

Descriptors: (*Semiconductors, Surfaces), (*Silicon, Surface properties), (*Transistors, Surfaces), Silicon compounds, Oxides, Contamination, Crystal lattice defects, Radiation damage, Control, Stabilization, Glass, Gases, Degradation, Gold, Diffusion, Dioxides, Gamma rays.

Studies were made of certain surface effects on silicon device parameters. These studies can be categorized as falling in three broad areas: the oxide-ambient gas interface, the oxide-semiconductor interface, and the oxide itself. Topics included in this investigation were: gross chemical contamination of oxide surfaces, oxide defects generated during manufacture of devices, interface distributions and gettering of metallics, modulation of surface electron density in MOS devices, and gamma-ray irradiation effects on conventional and MOS silicon devices. Also explained are the surface phenomena occuring in all these areas which might be consequential in the control and stabilization of semiconductor surfaces. (Author)

AD-618 744 Div. 25/4
CFSTI Prices: HC$1.00 MF$0.50

Naval Ordnance Test Station, China Lake, Calif.
INFRARED TRANSMITTANCE OF OPTICAL MATERIALS AT LOW TEMPERATURES.
Technical publication,
by George F. Linsteadt. Jun 65, 17p
Rept. no. NOTS-TP-3849
Task RMWC45 001 216 1F001 05 01
NAVWEPS 8767
Unclassified report

Descriptors: (*Optical materials, In frared radiation), (*Infrared optical materials, Absorption), (*Glass, Infrared radiation), (*Crystals, Infrared radiation), Semiconductors, Low-temperature research, Refractive index, Germanium, Silicon, Arsenic compounds, Sulfides, Strontium compounds, Titanates, Calcium compounds, Lithium compounds, Barium compounds, Fluorides, Magnesium compounds, Titanium compounds, Oxides.

Transmittance measurements of a variety of infrared optical materials were made at approximate temperatures of 50K, 85K, and 300K in the 1.0-micron to 15.0-micron wavelength region. The effects of these low temperatures on transmittance are presented in the form of curves, with transmittance as a function of wavelength. A change in external transmittance was measured for some materials. (Author)

AD-618 752 Div. 25/2
CFSTI Prices: HC$2.00 MF$0.50

Linde Div., Union Carbide Corp., Indianapolis, Ind.
CZOCHRALSKI RUBY.
Semiannual technical summary rept. for 1 Jan-30 Jun 65,
by O. H. Nestor. 29 Jul 65, 37p
Rept. no. SRCR-65-5
Contract Nonr413200, Proj. NR017 710; ARPA Order 30662
Unclassified report

See also AD-610 600.

Descriptors: (*Ruby, Crystal growth), (*Crystal growth, Ruby), Crystals, Chromium compounds, Oxides, Crystal structure, Fluoresence, Lasers, Crystal lattice defects, Optical properties, Diffraction.

The experimental program on growth of ruby crystals by the Czochralski technique during this report period has emphasized improved control over temperature fluctuations and temperature gradients in the system, to increase still further the homogeneity of the product. A thorough evaluation of the optical and crystallographic properties of Czochralski ruby is presented, showing the uniformly high quality of the material when grown with preferred orientations. The optical quality of Czochralski ruby ranges from very good for 60 degrees and good for 90 degrees crystals to fairly poor for 0 degrees material. Both 60 degrees and 90 degrees crystals are of exceedingly high crystallographic perfection; 0 degrees crystals are markedly inferior, exhibiting misorientations and dislocation densities of much greater magnitude. The fluorescence linewidth of Czochralski ruby is essentially independent of crystal orientation and is unaffected by annealing; an apparent concentration dependence is observed, with higher linewidths at higher chromium concentration levels. (Author)

AD-618 762 Div. 8/6, 20/2

Central Radio Propagation Lab., National Bureau of Standards, Boulder, Colo.
THE USE OF ELECTROMAGNETIC SIGNALS EMITTED FROM NUCLEAR EXPLOSIONS TO STUDY LONG-RANGE VLF PROPAGATION,
by A. G. Jean and J. R. Wait. 17 Dec 64, 4p
Unclassified report

Pub. in Journal of Geophysical Research v70 n5 p1258-61 Mar 1 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Nuclear explosions, Electromagnetic waves), (*Radio signals, Very low frequency), (*Very low frequency, Propagation), Wave transmission, Attenuation, Ionospheric propagation, Radiofrequency spectroscopy, Reviews.

A review of theories and some experimental results indicates that electromagnetic signals emitted from nuclear explosions are a useful tool for studying the propagation of very low frequency radio waves to great distances.

AD-618 786 Div. 8/6, 15/1

Michigan Univ., Ann Arbor. Radiation Lab.
DIFFRACTION BY THIN ELLIPTIC CYLINDERS,
by R. F. Goodrich and N. D. Kazarinoff.
18 Jun 62, 24p
Contract AF19 604 6655; Grant NSF G15549
Unclassified report

Pub. in Michigan Mathematical Journal v10 p105-27 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Diffraction, Cylindrical bodies), (*Boundary value problems, Diffraction), Electromagnetic wave reflections, Green's function, Model theory.

The problem considered is that of scalar diffraction of cylindrical waves from a line-source parallel to the axis of an elliptic cylinder B with either the Dirichlet or the Neumann boundary condition.

AD-618 797 Div. 25/3, 9/2

Massachusetts Inst. of Tech., Cambridge. Fluid Mechanics Lab.
SHOCK STRUCTURE IN A PARTIALLY IONIZED GAS,
by Michel Y. Jaffrin. 5 Oct 64, 20p
Contract Nonr184193

Unclassified report

Pub. in Physics of Fluids v8 n4 p606-25 Apr 1965 (Copies not available to DDC or Clearinghouse customers). Complete version of this rept. available from CFSTI HC$3.00, MF$0.75 as AD-608 340, 80p.

Descriptors: (*Plasma medium, Shock waves), (*Shock waves, Gas ionization), Electric fields, Atomic properties, Diffusion, Ions, Thermodynamics, One-dimensional flow, Continuum mechanics, Partial differential equations.

The structure of a steady plane shock in a partially ionized gas is investigated using the Navier-Stokes equations for the atom, electron, and ion fluids. Across the shock, quasi-neutrality and frozen ionization is assumed. For all degrees of ionization there is shown to be a broad thermal layer of elevated electron temperature ahead of the shock front and a precursor and imbedded axial electric field induced by the charge separation. Because of the large atom-ion charge exchange cross section, ion slip is small for less than 30% ionization. In a weakly ionized plasma, the atom flow is unaffected by the ionized particles and the structure consists of an ordinary atom shock imbedded in the thermal layer. For substantial ionization, the heavy particles are compressed and heated in the thermal layer and in the shock the ion and atom temperatures overshoot their downstream values. The induced electric fields increase with degree of ionization and free stream Mach number while the shock thickness decreases. A measurement in partially ionized hydrogen of potential variation in a strong shock gives a potential rise across the imbedded shock and thickness in good agreement with the calculated values. (Author)

AD-618 799 Div. 20/2

Queen's Univ., Belfast (Northern Ireland). Dept. of Applied Mathematics.
THE ANGULAR DISTRIBUTION OF ELECTRONS ELASTICALLY SCATTERED BY HELIUM ATOMS AND BY HYDROGEN MOLECULES,
by S. P. Khare and B. L. Moiseiwitsch. 5 Nov 64, 20p
Contract N62558 3634

Unclassified report

Pub. in Proceedings of the Physical Society v85 p821-39 1965 (Copies available only to DDC users).

Descriptors: (*Elastic scattering, Electrons), (*Electron bombardment, Helium), Hydrogen, Molecules, Atoms, Differential cross section, Polarization.

The differential cross sections for the elastic scattering of electrons by helium atoms and by hydrogen molecules were calculated over a wide range of electron impact energies with allowance made for the contribution to the scattering from the static fields of the target systems, for the effect of electron exchange and, in the case of helium, for the polarization of the target atom by the Coulomb field of the incident electron. The approximate methods which have been used include the Born approximation, the first-order exchange approximation and, in the case of helium, the numerical solution of the differential equations derived by making a partial wave analysis and employing the static field approximation together with a polarization potential term. Use was made of the zero- and first-order phase shifts calculated by Morse and Allis from the exact numerical solutions of the appropriate exchange approximation integro-differential equations for the helium case. It is found that the agreement between theory and experiment is quite satisfactory provided the experimental data for the angular distribution of elastically scattered electrons are normalized separately from the calculated differential cross section curves for each energy of impact, though there remains a tendency for the very small and the large scattering angle data to lie somewhat above that predicted by the theory.

AD-618 801 Div. 8/6, 8/1, 25/6

Brown Univ., Providence, R. I.
PROPAGATION OF ELECTROMAGNETIC WAVES IN CIRCULAR RODS IN TORSION.
Revised ed.,
by J. E. Adkins and R. S. Rivlin. 13 Jul 62, 30p

Unclassified report

Pub. in Philosophical Transactions of the Royal Society of London v255 n1059 p389-416 7 Mar 63 (Copies available only to DDC users).
Revision of manuscript submitted 23 Feb 62.

Descriptors: (*Electromagnetic waves, Propagation), (*Waveguides, Deformation), Rods, Cylindrical bodies, Elasticity, Continuum mechanics, Microwave frequency, Invariance.

Invariance considerations are employed to write down constitutive equations governing the propagation of electromagnetic waves in isotropic materials with a centre of symmetry which are subject of a static deformation. It is assumed that the dielectric displacement and magnetic induction vectors are linear functions of the electric and magnetic field intensities, respectively, but are general polynomial functions in the quantities which specify the deformation. The theory is employed to examine propagation along circular cylindrical rods in torsion. Rotating waves are produced whose speed of propagation and rate of rotation depend upon the magnitude of the deformation and the properties of the material. The nature of these waves is examined for the general case where there is no restriction either upon the amount of torsion or upon the magnitude of the effect. When the amount of torsion, or the dependence of the effect upon deformation is small, solutions can be obtained based upon those for the propagation of waves in undeformed materials. (Author)

AD-618 812 Div. 25/7, 4/4

National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
ELECTRON SPIN RESONANCE SPECTRA OF S202(-) IN IRRADIATED THIOSULFATE SINGLE CRYSTALS,
by J. R. Morton. 8 Feb 65, 6p
Rept. no. NRC-8429

Unclassified report

Pub. in Canadian Journal of Chemistry v43 p1948-51 1965 (Copies available only to DDC users).

Descriptors: (*Sulfur compounds, Oxides), (*Molecular spectroscopy, Sulfur compounds), (*Magnetic resonance, Sulfur compounds), Thiosulfates, Single crystals, Free radicals, Ions, Electrons, Spin.

Single crystals of Na2S2O3.5H2O were irradiated and examined, at room temperature, with an e.s.r. spectrometer. Two radicals are present: the species present in highest concentration is S2O2(-), the other species has not yet been identified. (Author)

AD-618 816 Div. 25/8

National Research Council of Canada, Ottawa (Ontario).
EQUATIONS FOR SOLAR HEAT GAIN THROUGH WINDOWS.
Research paper,
by D. G. Stephenson. 8 Sep 64, 9p
Rept. nos. RP-225, NRC-8527
Unclassified report

Presented at the Regional Technical Conference of the Engineering Inst. of Canada, Kingston, Ontario, 8 May 64.
Pub. in Solar Energy v9 n2 p81-6 Apr-Jun 65 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Solar radiation, Partial different equations), (*Heating, Solar radiation), (*Glass, Heat transfer), Building, Statistical analysis, Differential equations, Absorption.

An analysis of solar-radiation records obtained at Scarborough, Ontario, indicates that the insolation in Canada can be significantly greater than the values given by Moon's standard solar-radiation curves. It is possible to represent the solar data by a single analytical expression involving an atmospheric extinction coefficient and an apparent value of the solar constant. This expression allows the calculation of insolation on any surface and the determination of the time and date when the maximum insolation can occur for any surface. Simple expressions relate the time, date, latitude, building orientation, and the type of window glass and shading with the solar heat gain through windows. These can be used to program any digital computer to compute design values of the instantaneous heat gain through the windows of a building. (Author)

AD-618 820 Div. 25/2, 4/4, 22/1

Toronto Univ. (Ontario).
THE CRYSTALLINE FORM OF 1,3,5,7-TETRANITRO-1,3,5,7-TETRAZACYCLOOCTANE (HMX),
by M. Bedard, H. Huber, J. L. Myers, and George F. Wright. 11 Aug 62, 23p
Unclassified report

Pub. in Canadian Journal of Chemistry v40 p2278-99 1962 (Copies available only to DDC users).

Descriptors: (*HMX, Crystal structure), (*Crystal structure, HMX), Absorption spectrum, Dielectric properties, Polarization, Crystal lattices, Molecular isomerism, Canada.

The absorption spectra and dielectric constants of three of the four polymorphs of 1,3,5,7-tetranitro-1,3,5,7-tetrazacyclooctane (HMX) were examined. The difference in absorption frequencies shows that these crystal forms are more distinctive than are most polymorphs. Likewise the distortion polarizations of HMX-I, -II, and -III are markedly different whereas identical distortion polarizations have been found among typical polymorphic systems. The distortion polarizations of HMX-II and -III also are unique because they are appreciably temperature dependent, although this electrical property ought to be temperature independent. Because of these unique behaviors we have postulated that the so-called HMX polymorphs actually are lattice-caged conformational modifications. (Author)

AD-618 845 Div. 9/1

Michigan Univ., Ann Arbor. Dept. of Aeronautical and Astronautical Engineering.
RESOLUTION AND STRUCTURE OF THE WALL PRESSURE FIELD BENEATH A TURBULENT BOUNDARY LAYER,
by W. W. Willmarth and F. W. Roos. 2 Jul 64, 14p
Contract Nonr122430
Unclassified report

Pub. in J. Fluid Mech. v22 pt1 p81-94 1965
(Copies available only to DDC users).

Descriptors: (*Pressure, Turbulent boundary layer), (*Turbulent boundary layer, Pressure), Experimental data, Transducers, Statistical analysis, Integral transforms.

AD-618 846 Div. 25/3, 9/2

Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
COMPRESSIBLE PLASMA FLOW OVER A BIASED BODY,
by C. H. Su. 15 Sep 64, 7p
Contract Nonr184193
Unclassified report

Pub. in AIAA Journal v3 n5 p842-8 May 1965
(Copies not available to DDC or Clearinghouse customers.)
Revision of manuscript submitted 11 Mar 64.

Descriptors: (*Plasma medium, Compressible flow), (*Compressible flow, Plasma medium), (*Probes-(Electromagnetic), Plasma medium), Plasma sheath, Electrical properties, Viscosity, Stagnation point.

The flow field of a compressible plasma over a biased body is discussed with special emphasis on the electrical characteristics. The governing equations in various asymptotic regions are investigated. A stagnation-point probe theory, because of its great practical interest, is given in detail. An analytic current-voltage characteristic for proble potential between the floating and plasma potential is obtained for this case under the assumption of a very thin electrical sheath. (Author)

AD-618 852 Div. 20/1

Stanford Research Inst., Menlo Park, Calif.
EFFECT OF NUCLEAR SYMMETRY IN ION-ATOM SCATTERING,
by W. Aberth, D. C. Lorents, R. P. Marchi, and F. T. Smith. 12 Apr 65, 3p
AROD 5134:2
Unclassified report

Pub. in Physical Review Letters v14 n19 p776-8 May 10 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Elastic scattering, Atoms), (*Ion bombardment, Atoms), Nuclear structure, Helium, Ions.

AD-618 853 Div. 25/3, 25/6

Lockheed Missiles and Space Co., Palo Alto, Calif. Research Labs.
ANALYSIS OF THE NONDEGENERATE PARALLEL PUMPING OF MAGNETOELASTIC WAVES IN

FERROMAGNETS,
by R. L. Comstock and Eldon Hansen. 2 Dec 64, 3p
Unclassified report

Pub. in Journal of Applied Physics v36 n5 p1567-9 May 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Mechanical waves, Ferromagnetic material), (*Magnetic properties, Mechanical waves), (*Pumping(Electronics), Ferromagnetic material), Magnetic fields, Elasticity, Stability.

An analysis is presented of the parametric coupling of two standing magnetoelastic waves with different frequencies (nondegenerate) by an rf magnetic field parallel to the saturating dc magnetic field in a ferromagnet. The parametrically excited waves are located on separate branches of the magnetoelastic spectrum. The nondegenerate instability threshold is compared to thresholds for competing degenerate instabilities and conditions are derived under which the nondegenerate instability is favored. (Author)

AD-618 858 Div. 25/6, 13/4

Illinois Inst. of Tech., Chicago.
ON THE USE OF LINEARIZED YIELD CONDITIONS FOR COMBINED STRESSES IN BEAMS,
by R. Sankaranarayanan and P. G. Hodge, Jr. 22 Apr 58, 15p
Unclassified report

Pub. in Journal of the Mechanics and Physics of Solids v7 p22-36 1958 (Copies available only to DDC users).

Descriptors: (*Beams(Structural), Stresses), Structural parts, Linear systems, Numerical analysis, Loading-(Mechanics), Deformation.

Yield criteria expressed in terms of stress resultants are obtained for typical engineering structures, using the first fundamental theorem of limit analysis. These yield criteria, which are often non-linear, are then replaced by inscribed piecewise linear approximations. The complete solutions based on these approximate yield criteria provide lower bounds; the corresponding values for the upper bound can by obtained by multiplying the lower bound values by a suitable factor. A few examples are worked out to illustrate the simplicity achieved in determining the collapse load. (Author).

AD-618 894 Div. 9/4
CFSTI Prices: HC$2.00 MF$0.50

Bureau of Ships, Washington, D. C.
A PRELIMINARY HYDROFOIL DESIGN INCORPORATING A CAVITATION FREE OPERATION REQUIREMENT,
by Owen H. Oakley. 1964, 36p
Unclassified report

Descriptors: (*Hydrofoils, Design), (*Cavitation, Inhibition), Thickness, Wings, Optimization, Loading-(Mechanics), Lift, Drag, Statics, Nomographs, Vortices.

Four basic hydrofoil parameters were chosen as optimization parameters; (1) loading, (2) aspect ratio, (3) lift/drag ratio and, (4) the root bending stress. Consideration is given to only the static flying condition where all the load is carried by the total plan-form (i.e. there is no nacelle) and all the root bending stress is carried by foil thickness. A method for calculating the lift and drag characteristics of subcavitating hydrofoils operating near the free-surface is discussed.

AD-618 896 Div. 25/4
CFSTI Prices: HC$5.00 MF$1.00

GPL Div., General Precision, Inc., Pleasantville, N. Y.
PUMPED TRANSFORMER LASERS.
Technical summary rept. no. 1, 1 Nov 64-1 May 65,
by Cecil B. Ellis. 17 May 65, 160p
Rept. no. GPL-A-31-1
Contract Nonr471800, ARPA Order 306
Unclassified report

Descriptors: (*Lasers, Pumping(Electronics)), Neodymium, Glass, Cyanogen, Gases, Molecules, Nitrogen, Cesium, Atomic energy levels, Carbon, Molecular rotation, Molecular properties, Polymerization, Absorption spectrum, Absorption, Preparation.

A new concept is presented and its analysis begun: the transformer laser. This arrangement is intended to convert the outputs from many lesser, and lower quality, auxiliary lasers into a single coherent plane-wavefront by absorption and re-emission in the normal transitions of a molecular gas medium. Work during this contract period has dealt exclusively with analyses of suitable gaseous media to be pumped by a battery of Nd-glass lasers near 1.06 microns. The most promising gas molecule found so far for this purpose is CN, which would be obtained from the preparatory exposure of normal (CN)2 gas to a pulse of UV light. The analysis to date indicates a probable potential for operation at very useful power densities, but only a few of the possible questions about such a system have yet been explored. Alternative choices for the gas medium might be Cs(2) or metastable nitrogen molecules. Further analysis of these molecules as well as of CN is planned. (Author)

AD-618 903 Div. 25/2, 25/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
ON THE CHARACTER OF CRYSTAL-LATTICE DISTORTIONS IN THE INITIAL STAGE OF THE ORDERING PROCESS OF CoPt ALLOY,
by Yu. D. Tyapkin and K. M. Yamaleev.
22 Jul 65, 11p Rept. no. FTD-TT-65-392
TT 65-62815
Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady v155 n6 p1310-3 1964.

Descriptors: (*Platinum alloys, Cobalt alloys), (*Cobalt alloys, Platinum alloys), (*Crystal lattice defects, Cobalt alloys), Single crystals, Transformations, Crystal structure, X-ray diffraction analysis.

AD-618 909 Div. 25/6, 8/2, 25/2
CFSTI Prices: HC$3.00 MF$0.75

Philco, Blue Bell, Pa. Applied Research Lab.
A FUNDAMENTAL STUDY OF EPITAXY BY FLASH EVAPORATION.
Final rept. for 1 Oct 64-30 Mar 65,
by John L. Richards. 30 Apr 65, 76p Rept. no. A-049
Contract AF19 628 2937, Proj. 4608, Task 460805
AFCRL 65-412
Unclassified report

Descriptors: (*Semiconducting films, Epitaxial growth), (*Epitaxial growth, Semiconducting films), Evaporation, Vapor plating, Crystal structure, Germanium, Gallium alloys, Arsenic alloys, Solid solutions, Phase studies, X-ray diffraction analysis, Electron diffraction analysis, Absorption spectrum,

Impurities, Electrical properties, Mica, Phosphorus alloys, Indium alloys, Antimony alloys, Diodes-(Semiconductor).

A study was made of the conditions under which films of III-V compounds can be evaporated and deposited stoichiometrically onto a number of substrates. The crystalline nature and crystal quality of films of seven of the III-V compounds deposited onto Ge, CaF2, and GaAs substrates were studied with reference to changes in such parameters as evaporator and substrate temperature, lattice mismatch with substrate, and substrate orientation. Conditions were determined for the preparation of epitaxial films. Diodes were prepared in the deposited films by diffusion and alloying techniques. Electrical characteristics of these diodes were measured and found to be comparable with those in bulk material.

AD-618 918 Div. 8/6, 8/3, 25/3
CFSTI Prices: HC$3.00 MF$0.75

Space Sciences, Inc., Waltham, Mass.
NANOSECOND PULSE BREAKDOWN IN GASES.
Final rept. for Jan 64-Jan 65,
by P. Felsenthal and J. M. Proud. Jun 65, 70p
Contract AF30 602 2779, Proj. 4506, Task 450603
RADC TR-65-142
Unclassified report

Descriptors: (*Radar pulses, Gas discharges), (*Gas discharges, Radar pulses), (*Ionospheric propagation, Radar pulses), Microwave frequency, Pulse compression, Dielectric properties, Air, Nitrogen, Oxygen, Argon, Helium.

It is shown analytically that under certain conditions pulsed dc and pulsed microwave breakdown are directly comparable. A pulsed dc experimental system to measure breakdown over a wide range of applied voltage, gas pressure and gap distance has been used to measure formative time in the different gases. For those gases where sufficient basic data are available comparison of theoretical and experimental results show good agreement. Breakdown measurements in air have been used to calculate breakdown field strengths as a function of altitude and frequency for pulse lengths of 1 to 100 nanoseconds. (Author)

AD-618 919 Div. 25/4, 5/3, 30/3
CFSTI Prices: HC$4.00 MF$1.00

Precision Instrument Co., Inc., Palo Alto, Calif.
COHERENT-LIGHT RECORDING TECHNIQUES.
Final technical rept. for 1 Jan-31 Dec 64,
by Carl H. Becker, Siegfried Mohr, and Erwin L. Hahn.
Jun 65, 146p Rept. no. 4291
Contract AF30 602 3272, Proj. 4505, Task 450503
RADC TR-65-130
Unclassified report

See also AD-613 193.

Descriptors: (*Lasers, Recording systems), (*Recording systems, Lasers), Analog systems, Data storage systems, Broadband, Photographic film, Electron optics, Quantum mechanics, Deflection, Modulation, Prisms(Optics), Barium compounds, Titanates, Photographic techniques, Communication theory.

The purpose of this report is to summarize, define and demonstrate techniques necessary for the application of coherent light to the problems of recording and readout of analog information in excess of 10 to the 10th power bits per square inch, at frequency bandwidths of 100 megacycles per second. Investigations into such areas as the coherent light source itself, modulation, deflection or scanning techniques, readout techniques and the evaluation of recording media are reported.

AD-618 930 Div. 25/1
CFSTI Prices: HC$2.00 MF$0.50

Research and Advanced Development Div., AVCO Corp., Wilmington, Mass.
THE PROPAGATION OF INFRASONIC WAVES IN AN ISOTHERMAL ATMOSPHERE WITH CONSTANT WINDS.
Scientific rept.,
by Allan D. Pierce. 1 Jul 65, 42p
Rept. nos. SR-3; RAD-TR-65-21
Contract AF19 628 3891, Proj. 7637, Task 763702
AFCRL 65-492
Unclassified report

Descriptors: (*Sound transmission, Atmosphere), (*Acoustics, Atmosphere), Propagation, Mechanical waves, Wind, Gravity, Vector analysis, Fluid mechanics.

A dispersion relation for low frequency disturbances in an isothermal atmosphere with constant horizontal winds is derived which related the three components of the wave propagation vector k to the angular frequency omega and which depends on the sound speed, the wind velocity v, and the acceleration of gravity g. The relation is obtainable from that for propagation in an isothermal atmosphere without winds if omega is replaced by omega-k.v. The topology of the propagation surface in k space is examined and it is found that various modes of propagation are possible. The criteria for a given mode existing for given wind speed and frequency are derived and the group velocity of each type of mode is studied. The theory predicts the existence of two wind modes which, at sufficiently high frequencies, have group velocities nearly identical to the wind velocity. Phase velocities of the wind modes also tend to equal the wind velocity. In the latter portion of the paper, the trajectories of fluid particles are studied for each type of wave propagation mode. (Author)

AD-618 936 Div. 25/4, 25/6
CFSTI Prices: HC$4.00 MF$1.00

United Aircraft Corp., East Hartford, Conn. Research Labs.
RESEARCH PROGRAM ON NEW PEROVSKITE LASER HOST MATERIALS OF THE A(B'0.5 B''0.5) 03-TYPE HAVING CUBIC CENTROSYMMETRIC LATTICE SITES.
Final rept. for 1 Aug 64-31 Jul 65,
by F. S. Galasso, G. K. Layden, and D. E. Flinchbaugh.
30 Jul 65, 119p
Rept. no. UACRL-D910269-5
Contract Nonr460600, Proj. 4730, ARPA Order 306
Unclassified report

Descriptors: (*Lasers, Materials), (*Barium compounds, Single crystals), Crystal lattices, Impurities, Indium, Yttrium, Scandium, Tantalum, Neodymium, Gadolinium, Lutecium, Fluorescence, Optical properties, Crystal growth, Phase studies, Oxides.

Powders of perovskite-type compounds having the general formula Ba(B'0.5 Ta0.5)03, where B' is a trivalent rare earth cation, In(3+), Y(3+), or Sc(3+), were doped with trivalent laser activating ions and the fluorescent lifetimes were measured. The values obtained, i.e. 850 micro-sec for Nd(3+) doped Ba(Lu0.5 Ta0.5)03, 800 micro-sec for Nd(3+) doped Ba(Gd0.5 Ta0.5)03, and the long lifetimes obtained for other rare earth doped phases of this type indicate that some of them may make promising laser

materials. In addition, the optical properties of a number of other complex perovskite phases and some non-perovskite phases were measured. Studies involving flux growth crystals were also made during this period. In the first investigations, small, discolored crystals of Ba(La0.5 Ta0.5)03, Ba(Gd0.5 Ta0.5)03, Ba(Lu0.5 Ta0.5)03, Ba(Sc0.5 Ta0.5)03 and Ba(Y0.5 Ta0.5)03 were grown from a BaF2 flux. After detailed phase diagram studies of the Ba0-YTa04-B2O3 and Ba0-LuTaO4-B2O3 systems, clear single crystals of doped Ba(Y0.5 Ta0.5)O3 and Ba(Lu0.5 Ta0.5)O3 were grown from a B2O3 flux by slow cooling. In addition, a larger single crystal of Ba(Y0.5 Ta0.5)O3 was grown by a modified Czochralski technique. (Author)

AD-618 960 Div. 25/8, 9/1, 10/7

Ballistic Research Labs., Aberdeen Proving Ground, Md.
ON THE CHARACTERIZATION OF FIELDS OF DIABATIC FLOW. PART II. CALCULATIONS OF STEADY DIABATIC FLOW IN ONE AND TWO DIMENSIONS,
by B. L. Hicks, W. H. Hebrank, and S. Kravitz.
Jul 50, 45p Rept. no. 720
Proj. TB3 0110

Unclassified report

DDC reference use only.

Descriptors: (*Fluid flow, Heat transfer), Adiabatic gas flow, Perturbation theory, One-dimensional flow, Two-dimensional flow, Compressible flow, Numerical analysis, Combustion.

The purpose of the report is to describe specific calculations of diabatic flows in order that both the physical understanding of these flows and methods for their computation may be improved. After a review of the previously formulated theory, one-dimensional radial and vortex flows are considered. They illustrate several differences between adiabatic and diabatic compressible flows such as absence of limit circles and non-minimal stream-tube area at sonic velocity. Two-dimensional (uniplanar) flows describable by a potential are computed next. A third type of diabatic flow, somewhat less general than those preceding, is analyzed in more detail. Here the flow is uniform at infinity but is perturbed by a localized heat source. The velocity, pressure and density variations are calculated over the field of flow. Since the largest perturbation is on the density, it is the density perturbation which limits the size of the heat source that still permits a first-order perturbation calculation. The concluding section describes a formulation of the general equations for uniplanar flow in terms of the components, u, v of the Crocco vector.

AD-618 961 Div. 8/6

Central Radio Propagation Lab., National Bureau of Standards, Boulder, Colo.
CONCERNING THE MECHANISM OF REFLECTION OF ELECTROMAGNETIC WAVES FROM AN INHOMOGENEOUS LOSSY PLASMA,
by James R. Wait. 21 Jan 65, 5p
ARPA Order 183-62

Unclassified report

Pub. in Radio Science Journal of Research NBS/USNC-URSI v69D n6 June 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Ionosphere, Electromagnetic waves), (*Plasma medium, Electromagnetic waves), (*Electromagnetic waves, Reflection), (*Radio waves, Very low frequency), Electrical conductance, Perturbation theory, Electromagnetic fields, Low altitude.

Reflection of electromagnetic waves from a stratified lossy inhomogeneous plasma is discussed. The profile for the conductivity is idealized as an exponential curve with a superimposed Gaussian-shaped perturbation. By examining the change in the calculated reflection coefficient for various locations of the perturbation, some insight into the reflection process is gained. In particular, it is shown that reflection does not take place at a single level but, instead, a wide range of levels is important. The parameters of the problem are chosen to be representative of the D layer of the ionosphere and the wavelengths cover the range 10 km to 30 km. (Author)

AD-618 975 Div. 25/7

California Inst. of Tech., Pasadena.
STRUCTURE OF LIQUID NITROGEN,
by C. J. Pings and H. H. Paalman. 27 Mar 62, 4p
Grant NSF G11285

Unclassified report

Pub. in Molecular Physics v5 n5 p531-4 Sep 1962
(Copies available only to DDC users)
Prepared in cooperation with Stanford Univ., Calif.

Descriptors: (*Molecular structure, Nitrogen), (*Nitrogen, Liquefied gases), (*Liquefied gases, Molecular structure), X-ray diffraction analysis, Fourier analysis.

The experimentally determined electronic radial distribution function for liquid nitrogen at 7 atmospheres and -193C is reported, indicating an average coordination shell centred at 4.0A containing 15 molecules. Subsidiary peaks in the distribution at about 2.2A are shown to very likely arise from truncation of the Fourier integral. Analysis reveals that a restricted increase in the range of diffraction data may actually increase the prominence of certain error features. (Author)

AD-618 980 Div. 25/6

Southwest Research Inst., San Antonio, Tex. Dept. of Mechanical Sciences.
WAVE PROPAGATION IN AN ELASTIC NONHOMOGENEOUS BAR OF FINITE LENGTH,
by U. S. Lindholm and K. D. Doshi. 6 Dec 63, 8p
Contract AF49 638 1119
AFOSR 65-1159

Unclassified report

Prepared in cooperation with Franklin Inst., Philadelphia, Pa.
Pub. in Journal of Applied Mechanics 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Mechanical waves, Propagation), (*Elasticity, Rods), Stresses, Vibration, Deformation.

The case of an elastic disturbance propagating in a nonhomogeneous bar of finite length is solved by using the principle of virtual work. The nonhomogeneity is prescribed as a continuously varying modulus of elasticity with position in the bar. The density is assumed constant. Numerical results are presented for a finite-length pressure pulse in a free-free bar giving a comparison between the homogeneous and nonhomogeneous solutions. (Author)

AD-618 988 Div. 25/2, 15/1

Yale Univ., New Haven, Conn.
INTEGRITY BASES FOR VECTORS, THE CRYSTAL CLASSES,
by G. F. Smith and R. S. Rivlin. 18 Jun 63, 52p
Grant NSF G21347

Unclassified report

Pub. in Archive for Rational Mechanics and Analysis v15 n3 p169-221 1964 (Copies available to DDC users) Prepared in cooperation with Brown Univ., Providence, R. I.

Descriptors: (*Symmetry(Crystallography), Vector analysis), (*Vector analysis, Matrix algebra), Tensor analysis, Crystal structure, Invariance, Transformations-(Mathematics), Polynomials.

Irreducible integrity bases are determined for an arbitrary number of absolute vectors under the transformation groups describing 31 of the 32 crystal symmetries. The fundamental theorems in invariant theory which are used in generating the integrity bases are given. The triclinic, monoclinic, rhombic, tetragonal, hexagonal, and cubic systems are considered.

AD-618 996 Div. 25/3, 9/2

Brown Univ., Providence, R. I.
PRECURSOR WAVES IN SHOCK TUBES,
by A. C. Pipkin. 1 May 63, 7p
Grant G21347

Unclassified report

Pub. in the Physics of Fluids v6 n10 p1382-8 Oct 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Shock tubes, Shock waves), (*Shock waves, Propagation), (*Electrons, Propagation), Electric fields, Electrostatic fields, Numerical analysis.

Weymann's observation of a wave of electrons propagating from a strong shock into the region ahead of it is considered. By taking into account the nutual electrostatic repulsion of the electrons through a simple approximation, the main features of the precursor wave motion can be explained. In particular, the theory predicts the relatively gradual decrease in electron density from the shock to the electrostatic front, followed by exponential decay upstream from the electrostatic front. (Author)

AD-619 027 Div. 25/3
CFSTI Prices: HC$2.00 MF$0.50

Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
A BIBLIOGRAPHY ON MOVING STRIATIONS,
by Richard S. Palmer and Alan Garscadden.
Jun 65, 33p Rept. no. ARL-65-120
Proj. 7073, Task 707303

Unclassified report

Descriptors: (*Gas discharges, Bibliographies), (*Plasma medium, Bibliographies), Low-pressure research, Reviews.

A brief summary of present research and a bibliography concerning moving striations in low pressure (approx. 1 Torr) gaseous discharges is presented. Chronological order highlights the more recent work in the field of moving striations by Pekarek and Wojaczek. (Author)

AD-619 031 Div. 25/8, 13/1
CFSTI Prices: HC$3.00 MF$0.75

Naval Postgraduate School, Monterey, Calif.
LAMINAR CONVECTIVE HEAT TRANSFER IN THE ENTRANCE REGION BETWEEN PARALLEL FLAT PLATES.
Technical rept.,
by D. D. Lundberg and J. A. Miller. Jun 65, 68p
Rept. no. TR-54 Unclassified report

Descriptors: (*Heat transfer, Convection), (*Laminar flow, Heat transfer), (*Heat exchangers, Design), Difference equations, Digital computers, Temperature, Numerical analysis, Energy, Graphics.

Heat transfer rates for laminar, convective heat transfer in the entrance region between parallel plates were investigated. A hydrodynamic solution was used in the solution of the energy equation in finite difference form on a digital computer. The thermal boundary conditions include: constant heat input, constant wall temperature, one wall constant temperature and one wall insulated, and constant but different wall temperatures on the upper and lower walls. Approximate integral methods are shown to produce results that are in close agreement with the solutions in the present analysis for the constant heat input and constant wall temperature cases. The scope of the finite difference solution is limited to a narrow range of Prandtl numbers near unity, due to the small grid sizes required for convergence. (Author)

AD-619 037 Div. 8/6, 30/3
CFSTI Prices: HC$1.00 MF$0.50

Norwegian Inst. of Cosmic Physics, Univ. of Oslo.
A SWEEP-FREQUENCY SPECTRUM-ANALYZER FOR RECORDING IN THE RANGE 1 TO 45 CPS ON A PAPER CHART RECORDER.
Scientific rept.,
by Alv Egeland and Sven Olsen. 5 May 65, 23p
Rept. no. SR-2
Contract AF61 052 811
AFCRL 65-513

Unclassified report

Prepared in cooperation with Kiruna Geophysical Observatory (Sweden).

Descriptors: (*Spectrum analyzers, Radiofrequency spectroscopy), Disk recording systems, Atmospherics, Norway, Sweden.

The analyzer is designed for recordings of signal variation between about 0.5 and 100 microvolts. The signals from an antenna are led to a preamplifier with a voltage gain of about 10,000; the input impedance of the preamplifier is almost 500K ohms. In the mixer the signal from the preamplifier is mixed with 2 oscillator signals, one from a 1000-C fixed-frequency oscillator and the other from a variable-frequency oscillator sweeping from 2455 to 2545C. The output of the mixer is fed through an amplifier and into a tuning fork filter with a center frequency of 1500C and a bandwith of 0.5C. The 1500-C signals are amplified in a 3-stage audio amplifier and fed to a rectifier bridge which then gives a dc voltage proportional to the 1500C in the signal coming from the mixer. This voltage is large enough to drive a paper chart recorder. A 100-ohm continuous rotating potentiometer is mounted to the axis of the paper-drive mechanism of the pen recorder.

AD-619 042 Div. 9/1, 30/6
CFSTI Prices: HC$1.00 MF$0.50

Colorado State Univ., Fort Collins. Fluid Dynamics and Diffusion Lab.
INTEGRATED ARMY METEOROLOGICAL WIND-TUNNEL RESEARCH PROGRAM.
Final summary rept. for 1 May 64-30 Apr 65.
May 65, 18p Rept. no. CER65JEC30
Grant DA AMC28 043 64G9

Unclassified report

Descriptors: (*Fluid mechanics, Wind tunnels), (*Wind tunnels, Fluid mechanics), Turbulent boundary layer, Thermal properties, Fluid flow, Spheres.

Diffusion, Mathematical models, Army research, Micrometeorology.

Contents: I. Structure of turbulence: Structure over smooth and rough boundaries; structure perturbations produced by a single roughness over a smooth surface; systematic study of the effect of wall roughness on the structure of the turbulent flow over a flat plate; development of mathematical model for turbulence with planar homogeneity. II. Fundamental research on diffusion in turbulent shear flow: Instantaneous sampling equipment; measurement of concentration distribution in clouds emitted by instantaneous sources located in a turbulent boundary layer; verification of similarity criteria for turbulent diffusion by comparative studies of wind-tunnel and field diffusion data. III. Modeling of mountain lee waves in the wind tunnel and model wind structure near White Sands Missile Range meteorological tower.

AD-619 044 Div. 25/6
CFSTI Prices: HC$2.00 MF$0.50

Materials Research Corp., Orangeburg, N. Y.
INVESTIGATION OF ELECTRON BEAM PROCESSING OF ALUMINUM OXIDE AND RELATED MATERIALS.
Interim scientific rept.,
by W. Class and G. T. Murray. 15 Jun 65, 49p
Rept. no. SR-2
Contract AF19 628 4089, Proj. 5621, Task 562103
AFCRL 65-464

Unclassified report

Descriptors: (*Lasers, Materials), (*Sapphire, Crystal growth), (*Crystal growth, Electron beams), (*Electron beams, Crystal growth), Single crystals, Ruby, Aluminum compounds, Oxides, Impurities, Chromium, Etched crystals, Zone melting, Crystal lattice defects, Heaters.

The objective of the contract is the growth of superior quality crystals by a modified electron beam float-zone process. Sapphire host crystals grown by the electron beam float-zone technique were evaluated by etch pit techniques and revealed dislocation counts as low as 1000-10000/sq cm. The etch pit technique further disclosed the absence of substructure. These results compare favorably with flame-fusion crystals which typically exhibit both substructure and dislocation counts of approx. 1,000,000/sq. cm. Doping studies are currently under way to determine the most feasible method of introducing controlled amounts of chromium in the high vacuum environment required by the electron beam process. (Author)

AD-619 045 Div. 25/3
CFSTI Prices: HC$4.00 MF$1.00

Physics, Engineering, Chemistry Corp., Boulder, Colo.
INVESTIGATION OF THE DYNAMICS OF IONIZED MEDIA (PLASMAS).
Final technical rept.,
by Wesley E. Brittin and Willard R. Chappell.
May 65, 133p
Contract AF33 615 1334, Proj. 7071, Task 707103
ARL 65-91

Unclassified report

Descriptors: (*Plasma medium, Transport properties), (*Magnetohydrodynamics, Theory), Statistical mechanics, Statistical functions, Electrons, Bremsstrahlung, Electromagnetic fields, Particles, Photons, Scattering, Equations.

A theory of transport phenomena in a nearly homogeneous system of interacting electrons and photons is developed. A hierarchy of equations is derived which couples the various particle and photon distribution functions. The hierarchy is truncated in a physically intuitive way so that a closed set of equations is obtained. The truncated set of equations is then solved in various orders of approximation making use of the well-known Bogoluibov assumption concerning the rates of relaxation of correlations and distributions. There results a set of coupled equations for the particle and photon distributions. Terms in the resulting equations correspond to various physical processes such as shielded electron-electron scattering, bremsstrahlung, Thomson scattering, etc. (Author)

AD-619 056 Div. 25/8
CFSTI Prices: HC$4.00 MF$1.00

Oklahoma Univ., Research Inst., Norman.
EXPERIMENTAL DETERMINATION OF THERMAL RADIATION SCATTERING BY SMALL PARTICLES.
Interim rept. for Feb 64-Mar 65,
by T. J. Love and J. F. Beattie. Jun 65, 130p
Contract AF33 657 8859; Grant NSF GP360,
Proj. 7063, Task 706303
ARL 65-110

Unclassified report

See also AD-603 851.

Descriptors: (*Aerosols, Thermal radiation), (*Thermal radiation, Scattering), Particles, Aluminum, Carbon, Glass, Iron, Silicon compounds, Dioxides, Transport properties, Differential equations, Powders, Heat transfer, Graphics, Thermal properties.

The report describes the results of a study of the extinction and scattering of thermal radiation by optically thin clouds of small particles. The mass extinction coefficient, the angular distribution of scattered radiation and the ratio of scattering to extinction is reported for particles of aluminum, carbon, glass, iron and silica. The particles have average sizes of a few microns. Measurements are made for wave length ranges from 0.7 microns to 15 microns. (Author)

AD-619 058 Div. 25/4, 12/5
CFSTI Prices: HC$2.00 MF$0.50

Naval Ordnance Test Station, China Lake, Calif.
HITAB-BWSS PAYLOADS,
by John A. Hoyem, James E. Hurtt, and
Larry N. Pace. Aug 65, 43p Rept. no. NOTS-TP-3799
ARPA Order 243 61, Task RT7046 001 216 7F619 06 004
NAVWEPS 8738

Unclassified report

Descriptors: (*Infrared radiation, Earth), (*Payload, Sounding rockets), (*Radiometers, Infrared radiation), Background, Spectra(Infrared), Optical equipment.

The HITAB rocket probe program was conducted by the U. S. Naval Ordnance Test Station (NOTS), under sponsorship of the Advanced Research Projects Agency (ARPA) as a portion of Project DEFENDER. The purpose of this program is to measure the infrared and ultraviolet radiation of powered ICBM targets during the launching phase and of the earth's background from an observation point in space. A series of rocket probes, assigned the acronym HITAB-BWSS, which were designed to measure the Wiener spectrum of the earth's background in several narrow intervals in the infrared portion of the spectrum are documented. Data obtained by the HITAB-BWSS payloads are to be presented separately in a joint report by NOTS and the Institute of Science and Technology (IST), University of Michigan. This report will concern itself, therefore, with presenting details of the HITAB-BWSS experiment, mission profile, vehicle-payload configuration, optics, optical calibration, and the rocket flights conducted.

AD-619 060 Div. 25/2, 25/6
CFSTI Prices: HC$4.00 MF$0.75

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
LOW TEMPERATURE VAPOR GROWTH STUDIES.
Final rept. for 1 Jan 63-31 Dec 64,
by A. Reisman. Jul 65, 110p
Contract AF19 628 2468, Proj. 4608, Task 460805
AFCRL 65-188

Unclassified report

Descriptors: (*Semiconducting films, Crystal growth), (*Single crystals, Crystal growth), (*Crystal growth, Vapors), (*Germanium, Crystal growth), Iodine, Hydrogen, Gallium compounds, Arsenic compounds, Hydrides, Impurities, Pyrolysis, Disproportionation, Chlorides, Reduction(Chemistry), Epitaxial growth, Zinc compounds, Selenides, Reaction kinetics, Entropy, Chemical equilibrium, Oxides.

In the Ge-I2-H2-He vapor transport systems, GaI3, B2H6 and AsH3 were employed as doping agents. Using the hydrogen reduction of GeCl4, it was found possible to grow 'mirror' smooth Ge epitaxy of excellent bulk quality as low as 500C on <100> oriented surfaces. An apparatus for the pyrolysis of GeH4 in H2 was constructed and films of Ge epitaxy on Ge were grown. As a preliminary step toward obtaining fundamental kinetic information on heterogeneous fas-solid reactions in both dynamic (flow) and static(closed)systems, the relative importance of gas phase mass transport rates as compared to surface reaction rates was analyzed and described in detail. The entropy of gaseous GeCl2 at 700C was calculated to be 45 e.u. Preliminary results of a Bourdon Gauge study of equilibrium in the ZnSe-I2 system are discussed. Several exploratory approaches were utilized in an attempt to produce tetragonal GeO2.

AD-619 061 Div. 20/2, 20/1
CFSTI Prices: HC$3.00 MF$0.75

California Univ., Los Angeles. Dept. of Physics.
THE POLARIZATION OF 45 MeV PROTONS BY COMPLEX NUCLEI.
Technical rept.,
by Thomas A. Cahill. Jul 65, 82p Rept. no. TR-P-70
Contract Nonr23344

Unclassified report

Descriptors: (*Proton beams, Polarization), (*Elastic scattering, Protons), Nuclei, Beryllium, Carbon, Aluminum, Vanadium, Rhodium, Nuclear spins.

Contents: Beam Generation; Experimental Beam Observations; Measurement and Spurious asymmetries; Detectors and Electronics; Rotation of Polarization; Calibration of Polarization and Targets and Background.

AD-619 062 Div. 20/1, 20/3
CFSTI Prices: HC$4.00 MF$0.75

California Univ., Los Angeles. Dept. of Physics.
DECAY OF Ag102.
Technical rept.,
by Prasit Charoenkwan. May 65, 113p
Rept. no. TR-P-68
Contract Nonr23344

Unclassified report

Descriptors: (*Beta decay, Silver), (*Silver, Gamma emission), (*Nuclear energy levels, Palladium), Isomeric transitions, Internal conversion, Selection rules, Parity, Nuclear spins, K mesons, Meson capture, Nuclear spectroscopy.

The decay of the Ag102 isomers has been investigated using magnetic lens, scintillation, and solid state spectrometers. Half-lives of (13 ± 0.4) and (7.7 ± 0.5) min were assigned to the 5+ and 2+ spin isomers, respectively. Beta rays of 4.80-, 4.06-, 3.37-, 3.07-, 2.26-, 1.90-, 1.50-, 1.00-, and 0.65- MeV end-points and gamma rays of 0.558, 0.727, 0.853, 1.01, 1.28, 1.60, 1.80, 2.07, 2.79, and 3.33 were observed, and a large amount of K-capture was found. The isomeric transition proceeds by means of the internal conversion process. On the basis of gamma-gamma, gamma-gamma-gamma, beta-gamma, and x-ray-gamma coincidences, the level scheme was proposed. With the information from the internal conversion coefficient data, the isomeric transition, and coincidence measurements, spin and parity assignments have been possible. (Author)

AD-619 063 Div. 20/9, 20/5, 30/2
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Los Angeles. Dept. of Physics.
A GENERAL ORBIT CODE FOR CYCLOTRON ANALYSIS.
Technical rept.,
by David I. Hopp. May 65, 45p Rept. no. TR-P-67
Contracts Nonr23344, AT11 1 34, Proj. 93

Unclassified report

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Descriptors: (*Cyclotrons, Analysis), (*Programming-(Computers), Cyclotrons), Particle trajectories, Magnetic fields, Partial differential equations, Data processing systems.

A computer code, written in Fortran IV, is given for a 32K system, which will aid in the analysis of the various types of cyclotrons. The main restriction of this version is that there exists a magnetic median plane above and below which field values may be computed by an expansion involving terms linear in displacement. The field is stored in a point-by-point fashion in polar coordinates. A maximum of 6000 points is allowed in this version. The code is based upon ORNL-2765, by Gordon and Welton. A complete description of the mathematics used in the development of the code will be found in that reference. (Author)

AD-619 064 Div. 9/4, 31/5
CFSTI Prices: HC$1.00 MF$0.50

Hydronautics, Inc., Laurel, Md.
SUBCAVITATING HYDROFOIL SYSTEMS DESIGNED FOR OPERATION OVER A WIDE SPEED RANGE.
Preliminary rept.,
by R. A. Barr and V. E. Johnson, Jr.
3 Apr 62, 24p Rept. no. PR-119-6
Contract NObs84296

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Hydrofoils, Design), Hydrofoil boats, Cavitation, Velocity, Drag, Lift, Specifications, Operation.

Submerged subcavitating hydrofoil systems may be designed to operate efficiently over the entire speed range from take-off to maximum non-cavitating speeds. Such hydrofoil systems have optimum efficiency in the intermediate speed range between take-off and maximum

non-cavitating speed and this optimum may be only slightly less than the efficiency that would be obtained if the foil were designed for the maximum speed. Hydrofoil systems which utilize double slotted flaps for lift control are more efficient over the entire speed range than hydrofoils utilizing incidence or plain trailing edge flaps. Surface piercing foil systems may be operated over a wide speed range with little change in resistance. (Author)

AD-619 065 Div. 9/4, 31/5
CFSTI Prices: HC$3.00 MF$0.75

Hydronautics, Inc., Laurel, Md.
SUBCAVITATING HYDROFOIL SYSTEMS DESIGNED FOR OPERATION OVER A WIDE SPEED RANGE.
Preliminary rept.,
by R. A. Barr, J. A. Mercier, and V. E. Johnson, Jr.
3 May 62, 55p Rept. no. PR-119-6B
Contract NObs84296
Unclassified report

See also AD-619 064.

Descriptors: (*Hydrofoils, Design), Hydrofoil boats, Cavitation, Specifications, Hulls(Marine), Lift, Propellers(Marine), Performance(Engineering).

AD-619 070 Div. 25/6, 6/3
FSTI Prices: HC$1.00 MF$0.50

David Sarnoff Research Center, Princeton, N. J.
LOW TEMPERATURE INFRARED PHOTOCONDUCTORS.
Technical rept.,
by M. L. Schultz. 6 Jul 65, 21p
Contract Nonr222500
Unclassified report

See also AD-617 325.

Descriptors: (*Photoconductivity, Semiconductors), (*Infrared photoconductors, Cryogenics), (*Semiconductors, Photoconductivity), Oscillation, Germanium, Impurities, Copper, Gain, Low-temperature research, Electric fields.

Oscillations of photocurrent which are periodic in photon energy with a period equal to the longitudinal optical (LO) phonon energy have been investigated as a function of the percentage absorption of the incident radiation and as a function of electric field. From the result that the oscillation amplitude is independent of fractional absorption, it may be concluded that the oscillatory effect is not due to a periodically varying absorption coefficient. The oscillation amplitude as a function of electric field is such that the amplitude is independent of field at low fields and that the oscillations disappear at fields above about 30 volts/cm. The results have been interpreted in terms of a model in which carriers excited to high energies by photon absorption first lose energy very rapidly by emission of LO phonons and then, more slowly, gain or lose energy by interaction with the electric field and with acoustical phonons during the lifetime of the carrier. If the photoconductive gain is a function of carrier energy, the existence of oscillations and the form of the electric field dependence of the oscillation amplitude can be predicted. (Author)

AD-619 071 Div. 25/6, 25/4
CFSTI Prices: HC$6.00 MF$1.50

Harvard Univ., Cambridge, Mass. Div. of Engineering and Applied Physics.
THE OPTICAL PROPERTIES OF THIN GERMANIUM FILMS.
Interim Technical rept.,
by Paul Michael Grant. Jun 65, 213p Rept. no. HP-14
Contract Nonr186610, Proj. NR017 308
Unclassified report

Descriptors: (*Semiconducting films, Optical properties), Epitaxial growth, Calcium compounds, Fluorides, Vapor plating, Crystal structure, Reflection, Quartz, Wave transmission, Surface properties, Thickness, Band spectrum, Electron diffraction analysis, Spectrophotometers, Programming(Computers).

The central topic is the deduction of the optical constants from photometric measurements on epitaxial Ge films on CaF2 in the wavelength range 2000 - 6000A. Methods of film production are discussed, and the effect of deposition parameters on the crystallinity and reflectivity of films on fused quartz and CaF2 are reported. The principal conclusion is that epitaxial films give excellent agreement with bulk single crystal material as regards interband transition structure in their reflectivity and transmissivity coefficients R and T. However, the over-all amplitudes of R and T for films are strongly governed by residual surface roughness effects. Theoretical studies are carried out on the accuracy of derivation of the optical constants n and k from measurements of normal incidence R and T on a single film. A review is given of previous investigations and measurements of the optical properties and constants of germanium thin films. (Author)

AD-619 072 Div. 25/6, 25/2, 25/4
CFSTI Prices: HC$1.00 MF$0.50

Cornell Univ., Ithaca, N. Y. Lab. of Atomic and Solid State Physics.
DECAY OF LASER-INDUCED EXCITATIONS OF F-CENTERS.
Technical rept.,
by Dietmar Frohlich and Herbert Mahr. 30 Jul 65, 25p Rept. nos. TR-3, MSC-387
Contract NONR40147
Unclassified report

Descriptors: (*Color centers, Excitation), (*Excitation, Lasers), Alkali metal compounds, Halides, Cryogenics, Ground state, Electron transitions, Absorption spectrum.

A strong population of excited F-center states is achieved in various alkali halides using a short intense pulse of a Q-switched Ruby laser. During the presence of the excited F-centers the time dependence of their decay is measured with a fast-recording spectrometer. This is done by monitoring the absorption changes connected with the ground state or excited state populations. Using this method for crystals containing low F-center concentrations the lifetime of the excited state of F-centers in KI, RbI, CsI, RbBr and CsF is measured from 7K to about 80K by monitoring absorption changes in the region of the beta-, the beta-* and the F-band, respectively. For KI samples containing high F-center concentrations it is found that the decay curves are none nonexponential. (Author)

AD-619 074 Div. 25/6

Foriegn Technology Div., Wright-Patterson AFB, Ohio.
CONCERNING INFLUENCE MOMENTLESS TENSE STATE ON SPECTRA OF NATURAL OSCILLATIONS OF THIN ELASTIC SHELLS,
by V. V. Bolotin. 17 Apr 63, 25p
Rept. no. FTD-MT-63-22
TT 65-62846; AD 602 603 canceled
Unclassified report

Edited machine trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika i Mashinostroenie n4 p52-60 1962.

Available only for reference use at DDC Field Services. Copy is not available for public sale.

Descriptors: (*Elastic shells, Oscillation), Frequency, Stresses, Strain(Mechanics), Statics, Equations, Mathematical analysis, USSR, Panels(Structural).

Method used for construction of asymptotic solution of problem concerning natural oscillations of thin elastic shells taking into account initial momentless state of strain is presented. Known equations for states with large indices of variability are given. Boundary of application of method for shells of positive, zero and negative Gaussian curvature is established. As example, oscillation of spherical panel, supported on right angle (in generalized meaning) by contour and loaded gas pressure is considered.

AD-619 092 Div. 25/6, 25/8
CFSTI Prices: HC$3.00 MF$0.75

Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
THE BUCKLING BEHAVIOR OF UNIFORMLY HEATED THIN CIRCULAR CYLINDRICAL SHELLS,
by Bernard Ross, Nicholas J. Hoff, and Wilfred H. Horton. Apr 65, 67p Rept. no. SUDAER-225
Contract AF49 638 1276
AFOSR 65-0982

Unclassified report

Descriptors: (*Cylindrical bodies, Buckling(Mechanics)), (*Structural shells, Buckling(Mechanics)), Heat treatment, Deformation, Loading(Mechanics), Tests, Stresses, Compressive properties, Thermal stresses.

The results of buckling tests on uniformly heated, clamped, thin circular cylindrical shells are presented and discussed. Particular attention is paid to both the actual buckling process and the ensuing postbuckling behavior. Load versus end shortening curves are included and it is remarked that, in the thermal buckling problem, such curves are nonlinear. The possibility of 'snap-through' buckling, which occurs at a value of end shortening greater than that corresponding to the maximum supported load, is experimentally verified. A comparison of the present experimental results with available theory is made. It is observed that the experimental values of the buckling temperature can by substantially greater than the temperatures calculated by linear theory from the experimental buckling loads. (Author)

AD-619 093 Div. 25/3, 25/8
CFSTI Prices: HC$2.00 MF$0.50

Hebrew Univ., Jerusalem (Israel). Dept. of Physics.
ELECTRON DENSITY IONIZATION RATE AND APPROACH TO THERMAL EQUILIBRIUM BEHIND SHOCK WAVES BY MEANS OF MICROWAVE TECHNIQUES.
Final scientific rept.,
by W. Low. Oct 64, 27p
Contract AF61 052 401
AFOSR 65-1138

Unclassified report

Descriptors: (*Shock waves, Ionization), (*Plasma medium, Shock waves), (*Thermal properties, Plasma medium), Microwave frequency, Attenuation, Electric discharges, Electrons, Backward-wave oscillators, Interferometers, Shock tubes, Argon, Neon.

The following subjects are investigated: Improvement in the microwave diagnostics of shock waves; Investigations in the details of the time dependence and the shape of the microwave attenuation in shocks of air at pressures of 1 and 5mm of Hg; Measurements of the peak microwave attenuation of shock waves in argon and neon; The effect of constrictions and taper sections on the shock speed and on the microwave attenuation; Experiments with an electrical discharge shock tube; Construction of a 4mm Fabry-Perot interferometer; Testing a 4mm carcinotron.

AD-619 094 Div. 25/3, 9/1
CFSTI Prices: HC$2.00 MF$0.50

Innsbruck Univ. (Austria). Inst. of Theoretical Physics.
GASDYNAMIC METHODS IN MHD FLOW.
Final administrative rept. for 1 Jan 63-31 Dec 64. (Summary rept. no. 1),
by Ferdinand Cap, G. Kerer, F. Herrnegger, F. Lackner, and R. Skarics. 31 Dec 64, 42p
Contract AF61 052 675
AFOSR 65-1045

Unclassified report

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Descriptors: (*Magnetohydrodynamics, Gas flow), Plasma medium, Potential theory, Partial differential equations, Electrical conductance, One-dimensional flow, Magnetic fields, Numerical analysis, Austria.

An investigation of the use of Crocco's theorem for plasmas was conducted with emphasis on conditions for potential flow in a plasma, application of the method of characteristics and others of gasdynamics for plasma flows.

AD-619 095 Div. 25/6, 12/1
CFSTI Prices: HC$4.00 MF$1.00

Lockheed Missiles and Space Co., Sunnyvale, Calif.
STRUCTURAL SHELL OPTIMIZATION STUDIES. VOLUME I. SURVEY OF BUCKLING DATA FOR MONOCOQUE CIRCULAR CYLINDRICAL SHELLS SUBJECTED TO UNIFORM EXTERNAL PRESSURE.
Final technical rept.,
by E. V. Pittner. 30 Jun 61, 125p
Rept. no. 3-42-61-2
Contract NOrd18780FBM, Task 3

Unclassified report

Descriptors: (*Structural shells, Optimization), (*Monocoques, Buckling(Mechanics)), (*Cylindrical bodies, Stresses), Hydrostatic pressure, Guided missiles, Spacecraft, Design, Loading(Mechanics), Tables, Numerical analysis.

A broad survey is made of the available theoretical and experimental investigations of buckling of thin-walled monocoque circular cylindrical shells subjected to uniform external pressure. A simple, approximate method of analysis for the buckling of such a shell is offered for the purpose of stress analysis. The loading with hydrostatic external pressure is considered as a special case of the interaction relation, and the method of analysis for this case is based on an approximate interaction relation derived from earlier theory. Available test data are presented in tabular form. Diagrams are included in which properly selected test data are evaluated. A diagramatic comparison of the suggested method of analysis and the test data shows a reasonably close agreement. (Author)

AD-619 096 Div. 25/6, 12/1
CFSTI Prices: HC$3.00 MF$0.75

Lockheed Missiles and Space Co., Sunnyvale, Calif.
STRUCTURAL SHELL OPTIMIZATION STUDIES. VOLUME 3. INFLUENCE COEFFICIENTS AND FUNCTIONS OF FULL-TAPERED CONICAL SHELLS WITH APPLICATIONS TO THEIR OPTIMIZATION UNDER AXIAL LOADING.
Final technical rept.,
by E. Y. W. Tsui. 30 Jun 61, 69p Rept. no. 3-42-61-2
Contract Nord18780FBM, Task 3
Unclassified report

See also AD-619 095.

Descriptors: (*Structural shells, Optimization), (*Cylindrical bodies, Stresses), (*Conical bodies, Loading(Mechanics)), Deformation, Differential equations, Thickness, Guided missiles, Spacecraft, Numerical analysis, Tables.

An analysis of linearly tapered conical shells under axisymmetrical loads is presented. Influence coefficients and their related functions for the full conical shells within the practical range of shell parameters are evaluated by the high-speed digital computer. Facts concerning the convergency of the series solutions and the deviation of the influence coefficients between the tapered and uniform cones having average thicknesses are discussed. Also, the applications of these coefficients to the optimization of the elastically supported tapered cones under axial load is included. (Author)

AD-619 097 Div. 25/6, 12/1
CFSTI Prices: HC$2.00 MF$0.50

Lockheed Missiles and Space Co., Sunnyvale, Calif.
STRUCTURAL SHELL OPTIMIZATION STUDIES. VOLUME 4. EXPERIMENTAL BUCKLING TESTS OF MAGNESIUM MONOCOQUE ELLIPSOIDAL SHELLS SUBJECTED TO EXTERNAL HYDROSTATIC PRESSURE.
Final technical rept.,
by E. H. Nickell. 30 Jun 61, 40p Rept. no. 3-42-61-2
Contract Nord18780FBM, Task 3
Unclassified report

See also AD-619 096.

Descriptors: (*Structural shells, Optimization), (*Monocoques, Buckling(Mechanics)), (*Ellipsoids, Stresses), Hydrostatic pressure, Guided missiles, Spacecraft, Magnesium, Design, Tables.

A design curve is presented for estimating the buckling pressure for monocoque ellipsoidal shells subjected to an external hydrostatic pressure. This empirical estimation is based on test results from six magnesium ellipsoidal shells with a major to minor radius ratio of three. (Author)

AD-619 101 Div. 25/3, 9/1
CFSTI Prices: HC$3.00 MF$0.75

Kansas State Univ., Manhattan. Engineering Experiment Station.
THE EFFECTS OF ELECTRICAL CONDUCTANCE OF WALL ON MAGNETOHYDRODYNAMIC CHANNEL FLOW WITH HEAT TRANSFER,
by Un-Pah Hwang, Wilson Tripp, Ching-Lai Hwang, and Liang-tseng Fan. 1965, 58p
Special rept. no. 52
Grant AF AFOSR463 64
AFOSR 65-1312 Unclassified report

Kansas State Univ. Bulletin v49 n3 March 1965.

Descriptors: (*Magnetohydrodynamics, Electrical conductance), Fluid flow, Heat transfer, Transport properties, Ducts, Reviews.

The purpose of the report is to present the detailed as well as critical review of some mathematical and physical aspects of the MHD flow. This review should benefit the beginning investigators in this field. First, the details of the pioneering work by Hartmann and Lazarus on the subject of channel flow are described. The modified Hartmann flow with the electrical conductance of walls investigated by Chang and Lundgren, and by Chang and Yen are then reviewed. The effect of electrical conductance of the walls for both the thermally and hydrodynamically fully developed region was investigated very recently by Alpher, Yen, and Snyder. While their treatments are reviewed generally, only Snyder's approach is presented in detail.

AD-619 116 Div. 20/2

Enrico Fermi Inst. for Nuclear Studies, Univ. of Chicago, Ill.
SINGLE PI- PRODUCTION IN N-P COLLISIONS NEAR THRESHOLD,
Revised ed.,
by Robert Handler. 4 Feb 65, 15p
Unclassified report

Pub. in The Physical Review v138 n5B pB1230-44 Jun 7 1965
Revision of manuscript submitted 9 Sep 64
(Copies not available to DDC or Clearinghouse customers.)

Descriptors: (*Pions, Neutron reactions), (*Neutron reactions, Proton reactions), Inelastic scattering, Bubble chambers, Excitation.

Over 4000 n+ p to pion (-) +p+p events, obtained in a hydrogen bubble chamber, were analyzed. The kinetic energies of the initiating neutrons ranged from threshold to 440 MeV. The angular distributions, correlations, and energy partition of the final-state particles as well as the excitation function are presented. They are in excellent agreement with the phenomenological theory of Gell-Mann and Watson, except for the absence in the data of a sharp peak in the momentum partition distribution near the maximum allowed pion (-) momentum. The Ps amplitudes account for less than 1% of the total cross section. The intensities of the various types of transitions are determined. Examples of sets of amplitudes which yield these intensities are given. However, a large number of amplitudes contribute to the cross section, and the ambiguities are too great to allow evaluation of individual amplitudes. (Author)

AD-619 119 Div. 20/2

Michigan Univ., Ann Arbor.
PERIPHERAL PRODUCTION OF RHO MESONS BY PIONS OF 12 AND 18 BEV/C,
by Lawrence W. Jones. 28 Dec 64, 4p
Unclassified report

Pub. in Physical Review Letters v14 n6 p186-9 Feb 8 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Pions, Meson cross sections), Meson reactions, Nucleons.

AD-619 134 Div. 25/4, 25/3

Advanced Kinetics, Inc., Costa Mesa, Calif.
FARADAY EFFECT OF OPTICAL FREQUENCIES IN STRONG MAGNETIC FIELDS,
by R. W. Waniek, S. W. Lee, and N. George.
11 Oct 64, 3p
Contract AF49 638 1359, Proj. 9768
AFOSR 65-1140

Unclassified report

Prepared in cooperation with California Inst. of Tech., Pasadena. Pub. in Applied Optics v4 n2 p253 Feb 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Magneto-optic effect, Light), Polarization, Magnetic fields.

Direct measurements of rotary power at 6328 A are made for several optical materials subjected to transient fields up to 400 k-oersteds. The Verdet coefficients for these materials are extended into the very high-field region. The angle of rotation of the plane of polarization vs magnetic field is also plotted in a graph. These data have an estimated accuracy of ± 5%. (Author)

AD-619 139 Div. 20/2, 4/3

New South Wales Univ., Sydney (Australia).
ANNIHILATION RATES AND COLLISION COMPLEX OF POSITRONS IN FREON-12,
by J. H. Green and S. J. Tao. 5 Aug 63, 4p
Grant AF AFOSR62 398, Proj. 9767, Task 976701
AFOSR 65-1100

Unclassified report

Pub. in The Journal of Chemical Physics v39 n11 p3160-3161 Dec 1 1963.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Annihilation reactions, Positrons), (*Halogenated hydrocarbons, Annihilation reactions), (*Positrons, Halogenated hydrocarbons), Positronium, Coincidence counting, Refrigerants.

The lifetimes of positrons in Freon were measured at pressures from 1 to 5 atm. The apparatus used in the investigation depended on a wide-range nanosec time-to-pulse-height converter. For the longer lifetime component of positronium, the pressure coefficient is found to be 560,000 1/sec. atm. The shorter component is so small that at pressures above 2 atm it is scarcely detectable but does appear quite definitely at lower pressures. (Author)

AD-619 140 Div. 20/1

New South Wales Univ., Sydney (Australia).
FURTHER RESULTS ON THE BINDING ENERGY OF THE TRITON,
by J. M. Blatt and L. M. Delves. 13 Apr 64, 5p
Grant AF AFOSR400 62, Proj. 9751, Task 975101
AFOSR 65-1124

Unclassified report

Pub. in Physical Review Letters v12 n19 p544-6 May 11 1964.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Tritons, Nuclear binding energy), (*Nuclear binding energy, Tritons), Neutron scattering, Deuterons, Nuclear energy levels, Ground state.

Three trial wave functions are presented for further investigation of the binding energy of the triton. Significant improvements were obtained in the upper bound of the triton ground-state energy. Results for the three functions are presented and compared to former results. (Author)

AD-619 162 Div. 25/6
CFSTI Prices: HC$1.00 MF$0.50

Wales Univ., Cardiff.
RESEARCH ON RECOMBINATION THEORY IN SEMICONDUCTORS.
Annual scientific summary rept. no. 2, May 64-30 Apr 65,
by D. A. Evans, P. T. Landsberg, and E. F. Smith.
31 May 65, 9p Rept. no. SR-5
Contract AF61 052 664
AFCRL 65-476

Unclassified report

See also AD-603 090.

Descriptors: (*Semiconductors, Theory), Solid state physics, Recombination reactions, Electron transitions, Quantum mechanics, Cascade structures, Mathematical analysis, Scientific research.

AD-619 166 Div. 25/6, 4/4
CFSTI Prices: HC$3.00 MF$0.75

Tyco Labs., Inc., Waltham, Mass.
INVESTIGATION OF THE EFFECT OF THE CHEMICAL BOND ON THE ELECTRONIC PROPERTIES OF MULTI-COMPONENT SEMICONDUCTORS.
Final rept. for 1 Jun 62-31 May 65,
by Arthur J. Rosenberg and Fritz Wald. 31 May 65, 60p
Contract AF19 628 1615, Proj. 5620, Task 562001
AFCRL 65-433

Unclassified report

Descriptors: (*Semiconductors, Electrical properties), (*Chemical bonds, Semiconductors), (*Solid solutions, Semiconductors), (*Crystal growth, Semiconductors), (*Boron, Crystal growth), Cadmium compounds, Indium compounds, Lead compounds, Tin compounds, Tellurides, Selenides, Alloys, Phase studies, Crystal structure, Boron alloys, Platinum alloys.

Detailed investigations on the solid solubilities of CdTe and InTe in PbTe and SnTe, as well as of CdSe and InSe in PbSe were carried out, and pertinent information on the resulting pseudo binary systems was collected. Selected alloys were measured for their electrical properties and the crystallographic and electrical information was used to gain a better understanding about the applicability and limitations of a chemical bond approach to compound semiconductors. The phase diagram of the boron-platinum system was determined and phase information on systems of boron with the elements of groups Ib and IIb and the heavier elements of groups IIIa, IVa, Va, and VIa was collected. Some experiments on the solution growth of the red rhombohedral alpha-boron modification were carried out. (Author)

AD-619 167 Div. 25/7
CFSTI Prices: HC$1.00 MF$0.50

Chicago Univ., Ill. Lab. of Molecular Structure and Spectra.
MOLECULAR STRUCTURE AND SPECTRA.
Quarterly status rept. no. 34, 1 Apr-30 Jun 65.

30 Jun 65, 8p
Contract Nonr212101, Proj. 014 101
Unclassified report

Descriptors: (*Molecular structure, Molecular spectroscopy), (*Molecular spectroscopy, Molecular structure), Atomic energy levels, Helium, Chlorine.

The task consists of theoretical and experimental work in the field of molecular structure and spectra, with the general purpose of obtaining a better and more quantitative understanding of the spectra and energy levels of molecules and of the foundations of structural chemistry.

AD-619 172 Div. 8/6, 2/7, 2/1
CFSTI Prices: HC$2.00 MF$0.50

Air Force Cambridge Research Labs. Bedford, Mass.
SEASONAL ATMOSPHERIC ATTENUATION MEASUREMENTS AT 3.27 CM WAVELENGTH.
Environmental research papers,
by John P. Castelli. Jun 65, 28p
Rept. no. AFCRL-65-471, ERP-115
Proj. 4643, Task 464302
Unclassified report

Descriptors: (*Atmosphere, Attenuation), (*Radio astronomy, Microwaves), Sun, Extraterrestrial radio waves, Absorption, Measurement, Radiometers, Geophysics, Meteorological parameters, Tables, Atmospheric sounding.

Atmospheric attenuation measurements have been made for four seasons during 1962 and 1963 at Sagamore Hill, Hamilton, Massachusetts, at a wavelength of 3.27 cm. A definite seasonal trend was noted with the greatest attenuation observed during the winter when an average vertical attenuation of 0.13 db was measured. The trend seems to be well correlated with seasonal averages of surface barometric pressure. Summer attenuation in 1964 is compared with similar measurements made in 1946 in the same geographical area. (Author)

AD-619 177 Div. 25/4, 24/1, 20/2
CFSTI Prices: HC$2.00 MF$0.50

Technical Operations Research, Burlington, Mass.
MODIFICATION OF THE TECH/OPS PHOTOMETRIC MEASUREMENT ASSEMBLIES.
Final rept. for 4 Jan-3 May 65,
by I. L. Kofsky, C. S. Miller, A. J. Theriault, and R. H. Johnson. Jun 65, 39p Rept. no. TO-B-65-44
Contract AF19 628 4962 Proj. 5710
AFCRL 65-413
Unclassified report

Descriptors: (*Radiometers, Sky brightness), (*Photometers, Sky brightness), (*Nuclear explosions, Sky brightness), Measurement, Cameras, Infrared phenomena, Infrared equipment, Photomultipliers, Nitrogen, Optical filters, Spectra(Infrared), Spectra-(Visible + ultraviolet).

Four Tech/OPs photometric assemblies, consisting of photometers, radiometers, and radiometrically calibrated cameras, have been modified. The twelve-channel photometer has been improved by the addition of two filters for measuring the irradiance in ultraviolet N2 Second Positive bands. The near-infrared photometer was fitted with a six-position interference filter wheel to permit observation of some of the N2 First Positive bands and OI permitted lines; in addition, its S-1 surface photomultiplier was enclosed in a thermoelectric refrigerator. The infrared radiometer now has a four-position filter wheel, and the temperature of its PbS photoconductive cell is monitored by a thermistor thermometer. De Havilland Mark 7A 35-mm data-recording cameras (with 100-ft magazines and flexible shutter programming) fitted with lenses having 108 degree circular fields replace the Nikon cameras and 77 degree lenses formerly used. All equipment has been made compatible with the mechanical mounts, windows, electrical power, and data-recording arrangements of the two Air Force KC-135 aircraft in which it will eventually be used. (Author)

AD-619 180 Div. 25/8, 25/6
CFSTI Prices: HC$1.00 MF$0.50

Carnegie Inst. of Tech., Pittsburgh, Pa.
THERMAL AND MAGNETIC PROPERTIES OF METALS AT CRYOGENIC TEMPERATURES.
Status rept. no. 1, 1 Feb-1 Jul 65,
by S. A. Friedberg. 1 Jul 65, 8p
Contract Nonr76026, Proj. NR018 301
Unclassified report

Descriptors: (*Cryogenics, Metals), (*Metals, Cryogenics), Specific heat, Formates, Salts, Manganese compounds, Iron compounds, Nickel compounds, Zinc compounds, Chlorides, Powders, Copper compounds, Thermal properties, Magnetic properties, Colorimeters.

Contents: Colorimetry above 1K, Magnetic susceptibility measurements, Colorimetry below 1K, Magnetization measurements, Miscellaneous theory.

AD-619 181 Div. 25/6, 30/2

Pennsylvania State Univ., University Park.
Dept. of Engineering Mechanics.
COMPUTER ANALYSIS METHODS IN DYNAMICS AS APPLIED TO STRESS WAVES AND SPHERICAL CAVITIES.
Engineering research bulletin,
by Norman Davids and Pravin Mehta. May 65, 74p
Rept. no. ERB-B-92
Contract DA36 034ORD3576RD
Unclassified report

Available from Engineering Publications, Pennsylvania State Univ., University Park, Pa. 16802 HC$2.00.

Descriptors: (*Stresses, Spheres), (*Numerical methods and procedures, Programming(Computers)), (*Dynamics, Numerical analysis), Solids, Mechanical waves.

Computer analysis, a direct numerical method for analyzing stress wave propagation in solid bodies, is described and applied to a group of dynamic problems. This method incorporates the governing physical laws directly into computer programs to product dynamic changes occurring in a system, thus completely bypassing the differential equations to reach the final results. Propagation schemes and sample programs are presented for problems of elastic and plastic wave propagation in a thin bar and in a sphere. The method is quite general and can be extended to many other dynamic problems. (Author)

AD-619 182 Div. 25/5
CFSTI Prices: HC$1.00 MF$0.50

Brandis Univ., Waltham, Mass.
ON THE DERIVATION OF GENERALIZED MASTER EQUATIONS,

by P. M. Mathews. 1964, 19p
Contract Nonr167704

Unclassified report

Descriptors: (*Quantum mechanics, Equations), Probability, Perturbation theory, Matrix algebra, Hamiltonian, Operators(Mathematics).

AD-619 183 Div. 25/5, 2/6
CFSTI Prices: HC$1.00 MF$0.50

Institute of Field Physics, Univ. of North Carolina, Chapel, Hill.
JOINT REPORT TO AIR FORCE OFFICE OF SCIENTIFIC RESEARCH AND OFFICE OF NAVAL RESEARCH.
Status rept. and Technical operating rept. for 1 Dec 64-31 May 65,
by Bryce S. DeWitt. 31 May 65, 13p
Contract Nonr85507; Grant AF AFOSR153 63, Proj. NR013 102

Unclassified report

Descriptors: (*Relativity theory, Gravity), (*Gravity, Relativity theory), (*Quantum mechanics, Relativity theory), Field theory, Tensor analysis, Invariance, Geometry.

Summaries are given of the work done in the following fields: Inner product in the canonical quantum theory of relativity; Radiation damping in a gravitational field; Classical relativistic mechanics of interacting point particles; Conceptual basis and use of geometric invariance principles; Spinor-tensors; Identities for the curvature tensors in non-riemannian geometrics; Pedagogical methods in relativity theory; Photon bound states and gravitons; Effect of terms quadratic in the riemann tensor upon the field equations of general relativity.

AD-619 187 Div. 20/1
CFSTI Prices: HC$3.00 MF$0.75

Nevis Labs., Columbia Univ., Irvington-on-Hudson, N. Y.
ISOTOPIC DIFFERENCES IN THE MU-MESIC K X-RAY ENERGIES OF 016 -018, Ca40-Ca44, Sn116-Sn124, Gd155-Gd160.
Doctoral thesis,
by Charles Nissim-Sabat. Mar 65, 89p
Rept. nos. NEVIS-129, CU-235
Contract Nonr26672

Unclassified report

Descriptors: (*Isotopes, Nuclear structure), (*Moons, Isotopes), X-ray spectroscopy, Nuclear energy levels, Oxygen, Calcium, Tin, Gadolinium.

The isotope differences in the mu-mesic K x-ray energies of 016-018, Ca40-Ca44, Sn116-Sn124, Gd155-Gd160 were measured in order to obtain information about the change in the radius of the nuclear proton distribution as the neutron number is increased. The essential feature of the experimental method is the simultaneous measurement of the spectra of the two isotopes by means of a conventional NaI(Tl) crystal gamma-ray spectrometer. Great care was taken to avoid any bias or non-statistical errors in measurements and analysis by treating the two isotope targets in an exactly similar fashion.

AD-619 190 Div. 25/6
CFSTI Prices: HC$1.00 MF$0.50

Delaware Univ., Newark. Dept. of Physics.
ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.
Status rept. no. 5, 1 Apr-30 Jul 65,
by K. W. Boer. 30 Jul 65, 4p
Contract Nonr433600

Unclassified report

See also AD-614 439.

Descriptors: (*Semiconductors, Field theory), (*Photoelectric materials, Field theory), Electron optics, Cadmium compounds, Sulfides, Crystal growth, Electrodes, Single crystals, Crystal growth, Dielectrics.

AD-619 191 Div. 25/4, 14/2
CFSTI Prices: HC$4.00 MF$0.75

California Univ., Berkeley. Space Sciences Lab.
ON THE USE OF RUTILE AS AN 8MM MASER MATERIAL.
Technical rept. (revised ed.),
by Toshio Hori and Joseph Wakabayashi.
20 Nov 64, 103p Series no. 5, issue no. 39
Contract Nonr22254, Proj. NR370 720

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.
Revision of rept. dated 10 Jul 64.

Descriptors: (*Rutile, Masers), (*Masers, Rutile), Radio astronomy, Solid state physics, Paramagnetic resonance, Theory, Hamiltonian, Impedance matching, Waveguides, Chromium, Iron, Crystal structure, Dielectric properties, Single crystals, Pumping-(Electronics), Taper, Broadband, Push-pull amplifiers, Reflection.

This report is to present some considerations and experiments which were made in the course of design of an 8 mm traveling wave maser for radio astronomy application. In Part I a brief review of solid state maser theory and paramagnetic resonances will be made. In Part II some examples of the application of the spin Hamiltonian of paramagnetic material to maser design will be presented. Also, frequency characteristics of quarter wave matching transformers will be considered. At the end of Part II, the present scheme of impedance matching between standard waveguide to maser amplifier will be presented. In Part III some experiments which have been done to support the matching design: determination of crystal axis by Laue back reflection method; measurement of dielectric constant of materials which will be used in constructing maser amplifiers. Also, experimental considerations on broad band matching will be presented. (Author)

AD-619 197 Div. 25/2, 25/4
CFSTI Prices: HC$1.00 MF$0.50

Perkin-Elmer Corp., Norwalk, Conn.
EVALUATION OF CERIUM OXIDE AS A LASER HOST: GROWTH AND EVALUATION OF Ce02 AND Th02.
Quarterly rept. no. 3,
by Robert C. Linares. 1965, 5p
Contract Nonr466000, ARPA Order 3C6 62

Unclassified report

Descriptors: (*Lasers, Materials), (*Cerium compounds, Dioxides), (*Thallium compounds, Dioxides), (*Crystal growth, Lasers), Impurities, Color centers, Crystal structure, Optical materials, Radiation damage.

Investigation of the properties and crystal growth of Th02 was begun. Some work continued on attempts to grow large crystals of Ce02 by slow cooling of the flux and by the gradient technique. (Author)

AD-619 198 Div. 25/6, 25/7, 25/2
CFSTI Prices: HC$1.00 MF$0.50

Cornell Univ., Ithaca, N. Y. Lab of Atomic and Solid State Physics.
EXCITED STATE SPECTROSCOPY USING A Q-SWITCHED RUBY LASER; LOCALIZED EXCITONS IN MIXED ALKALI HALIDES.
Progress rept. for 1 Oct 64-30 Sep 65,
by Paul L. Hartman and Herbert Mahr. 30 Sep 65, 5p
Contract Nonr40147
Unclassified report

Descriptors: (*Crystals, Spectroscopy), (*Color centers, Excitation), (*Absorption spectrum, Crystals), Lasers, Potassium compounds, Halides, Spectra-(Visible + ultraviolet), Photons.

Studies in the following areas are summarized: light absorption in the presence of excited states (strongly populated using a Q-switched laser) in KI, CsI, and RbBr; lifetimes of the relaxed excited state of F-centers in KI, CsI, RbBr, and CsF; absorption edge of I(-) in KBr single crystals; process of F-center formation with ultraviolet light of mixed and pure alkali halides.

AD-619 199 Div. 25/6

Explosive Research and Development Establishment, Waltham Abbey (England).
A MECHANISM FOR THE CONTROL OF CRACK PROPAGATION IN ALL-BRITTLE SYSTEMS,
by J. Cook and J. E. Gordon. 19 Mar 64,
19p Offprint no. 65/2
Unclassified report

Pub. in Proceedings of the Royal Society A v282 p508-20 1964.
(Copies available only to DDC users).

Descriptors: (*Fracture(Mechanics), Brittleness), (*Brittleness, Fracture(Mechanics)), Great Britain, Stresses, Mathematical analysis, Surface properties.

The stress distribution close to the tip of a crack which has a finite tip radius and which is being opened either by means of a remotely applied tension field sigma sub(y,0) or by means of a concentrated force (e.g. a wedge driven into the crack) has been computed. It is shown that there exist tensile stresses sigma sub x parallel to the plane of the crack and ahead of the crack tip. The maximum value of the tension sigma sub x is an approximately constant fraction about 1/5 of the peak stress concentration sigma sub(y, max) which usually causes crack propagation. Inside a brittle solid, if a plane of weakness or potential cleavage is present and is roughly normal to the plane of the original crack, this interface may break and produce a secondary crack in such a manner as to interfere with the progress of the primary crack. If the ratio of the adhesive strength of the interface to the general cohesive strength of the solid is in the right range large increases in the strength and toughness of otherwise brittle solids may result. (Author)

AD-619 200 Div. 20/1
CFSTI Prices: HC$1.00 MF$0.50

Carnegie Inst. of Tech., Pittsburgh, Pa.
Dept. of Physics.
'NUCLEAR HARTREE-FOCK CALCULATIONS'.
Technical rept.,
by R. Muthukrishnan and M. Baranger. Jun 65
13p Rept. no. TR-16
Contract Nonr76015, Projs. NR024 439, NR012 202
Unclassified report

Descriptors: (*Nuclear energy levels, Nuclear binding energy), Nuclear forces, Carbon, Oxygen, Silicon, Calcium, Zirconium, Matrix algebra, Hamiltonian.

Single particle levels, binding energies and single particle wave functions are calculated for C12, 016, Si28, Ca40 and Zr80, using a matrix Hartree-Fock method. The two body interaction used acts only in relative states. The truncation of the matrices and the convergence are discussed. The agreement with experimental results are quite good. (Author)

AD-619 207 Div. 9/1
CFSTI Prices: HC$1.00 MF$0.50

Massachusetts Inst. of Tech., Cambridge.
Dept. of Mathematics.
RESEARCH IN FLUID DYNAMICS.
Final rept. for 16 Sep 60-15 Sep 63,
by G. B. Whitham and H. P. Greenspan. 15 Sep 63, 4p
Contract AF49 638 708, Proj. DSR7 8317
AFOSR J1350
Unclassified report

Descriptors: (*Scientific research, Fluid mechanics), (*Fluid mechanics, Scientific research), Dynamics, Propagation, Shock(Mechanics), Magnetohydrodynamics, Water waves, Hydrodynamics.

Important research contributions in the areas of wave propagation and shock dynamics, Magnetohydrodynamics, hydrodynamic stability, oceanic circulation, and dynamics of rotating fluids are listed.

AD-619 209 Div. 25/8, 9/6
CFSTI Prices: HC$5.00 MF$1.00

Vidya Div., Itek Corp., Palo Alto, Calif.
MASS, MOMENTUM, AND HEAT TRANSFER WITHIN A TURBULENT BOUNDARY LAYER WITH FOREIGN GAS MASS TRANSFER AT THE SURFACE. PART I. CONSTANT FLUID PROPERTIES.
Final rept. no. 111,
by Robert M. Kendall, Morris W. Rubesin, Thomas J. Dahm, and Michael R. Mendenhall. 1 Feb 64, 162p
Contract Nonr399700, Proj. 2740, ARPA Order 322
Unclassified report

Rept. on Proj. DEFENDER.

Descriptors: (*Turbulent boundary layer, Transport properties), (*Transport properties, Turbulent boundary layer), Heat transfer, Momentum, Surface properties, Fluid dynamic properties, Experimental data, Injection, Integral equations, Wake, Supersonic flow, Two-dimensional flow, One-dimensional flow, Velocity, Friction, Temperature, Graphics.

A critical reexamination is made of existing experimental data on the velocity, temperature, and concentration profiles in a low-speed, constant property turbulent boundary layer with surface mass injection. It is found that a model of the boundary layer can be constructed that fits the local profile data as well as the local drag, mass, and heat-transfer coefficients at the surface. The essential features of the model include a 'law of the wall' that pro-

vides a continuous and smooth profile from the surface to the fully turbulent region and a 'wake region' that joins the inner region smoothly and is characterized by an eddy diffusivity that is constant with respect to distance from the wall. Four empirical parameters appear in the analysis: the Prandtl mixing length constant, K; the Clauser eddy diffusivity Reynolds number; an inner region mixing length constant analogous to Rotta's intercept constant; and a value of turbulent Schmidt or Prandtl number. Constant values of these parameters are found to be suitable in predicting data over a wide range of surface blowing or suction and Reynolds number. (Author)

AD-619 214 Div. 20/2
CFSTI Prices: HC$1.00 MF$0.50

General Atomic Div., General Dynamics Corp., San Diego, Calif.
IONIZATION ENERGY DEPOSITON FROM 14-MeV NEUTRON BOMBARDMENT OF SILICON AND GERMANIUM,
by D. K. Nichols. 10 Feb 65, 7p Rept. no. GA-6136
Contract DA49 186AMC65X, Proj. 344
Unclassified report

Descriptors: (*Neutron reactions, Ionization), (*Ionization, Energy), (*Silicon, Neutron reactions), (*Germanium, Neutron reactions), Recoil atoms, Charged particles.

Bombardment of silicon and germanium with 14-MeV neutrons creates energetic recoil atoms and light charged particles which lose some or all of their energy in ionizing collisions. An estimate of the amount of energy deposited in ionizing processes and the rate of formation of electron-hole pairs is calculated from recent experimental data. (Author)

AD-619 215 Div. 25/3, 20/9
CFSTI Prices: HC$1.00 MF$0.50

Avco-Everett Research Lab., Everett, Mass.
EXPERIMENTS ON MAGNETICALLY PRODUCED AND CONFINED ELECTRON CLOUDS,
by G. S. Janes. Jun 65, 10p
Rept. no. AMP-165
Contracts AF49 638 659, AF49 638 1553
Unclassified report

Descriptors: (*Electron beams, Production), (*Magnetrons, Electron beams), Cyclotrons, Injection, Electrons, Electrostatics, Electron optics.

This letter presents experimental evidence indicating that a stable dense 'cloud' of electrons with an associated negative electrostatic potential well can be produced inductively in cylindrical geometries. In these experiments, the electron 'cloud' is produced by injecting electrons near the outer cylindrical wall while an axial magnetic field is rising. The electrons remain attached to the field lines on which they were injected and are therefore moved towards the center as the magnetic field lines converge. The equilibrium configuration, some empirical evidence regarding stability limits on the electron density, and the experimental verification of the basic inductive charging concept are discussed.

AD-619 217 Div. 25/6, 25/2
CFSTI Prices: HC$1.00 MF$0.50

California Univ., Riverside.
BEHAVIOR OF SOLIDS UNDER HIGH PRESSURE.
Final rept. for 1 Jul 61-30 Jun 65,
by A. W. Lawson. Jul 65, 5p
Contract NONR184205
Unclassified report

See also AD-433 019 and AD-602 044.

Descriptors: (*Solids, High-pressure research), (*High-pressure research, Solids), Solid state physics.

A listing is given of 19 publications that resulted from the research, and the research being still conducted on 4 projects. These projects are on the compressibilities of the europium chalcogenides, and on the effects of pressure on the Curie temperature of sodium nitrite, on self diffusion in bismuth, and on the elastic constants of thallium bromide.

AD-619 226 Div. 25/6
CFSTI Prices: HC$1.00 MF$0.50

Harry Diamond Labs., Washington, D. C.
ANALYSIS OF THE RESISTIVE LAYER TRANSDUCER,
by John L. Scales, III. 15 Jun 65, 23p
Rept. no. TM-65-5
Projs. DA1P523801A300, 96392
Unclassified report

Descriptors: (*Piezoelectric transducers, Semiconductors), (*Semiconductors, Piezoelectric effect), Vibration, Ultrasonic radiation, Piezoelectric crystals, Resonance, Differential equations, Boundary value problems, Mathematical analysis.

In a piezoelectric semiconductor, a surface layer of high resistivity material is driven by an alternating electric field, while the conducting substrate is mechanically coupled but not driven electrically. This analysis shows the response of the composite system, giving the behavior with frequency and effects due to loading. For reasonable (low) values of the attenuation constant, it is shown that the effect of the substrate is to lower the amplitude of vibration but leave the resonant frequency almost unchanged. An assumption, which limits the analysis, is that the proportionality constant between stress and rate of change of strain is independent of frequency. (Author)

AD-619 233 Div. 25/3

Chicago Univ., Ill.
A FORMULATION OF THE THEORY OF ISOTROPIC HYDROMAGNETIC TURBULENCE IN AN INCOMPRESSIBLE FLUID.
Technical rept.,
by Lawrence L. Lee. 20 Aug 64, 31p
Contract Nonr212124
Unclassified report

Pub. in Annals of Physics v32 n2 p292-321 Apr 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Magnetohydrodynamics, Turbulence), (*Incompressible flow, Turbulence), Theory, Perturbation theory, Series, Integral equations, Numerical analysis, Magnetic fields, Correlation techniques.

The theory of hydromagnetic isotropic turbulence in incompressible fluids is formulated using methods similar to those of quantum field theory. The present formulation is a generalization of Wyld's formulation of ordinary isotropic turbulence in incompressible fluids. Solutions for the velocity and magnetic field in the form of perturbation series are set up. Terms in the series are then represented by a one-to-one correspondence by diagrams similar to Feynman diagrams. A study of these diagrams reveals that they may be rearranged to give integral equations

governing the second order correlation functions for the velocity and the magnetic field. These integral equations contain an infinite number of terms. To obtain manageable results, the equations are truncated at finite orders, yielding approximate equations. An approximation at the lowest order gives Chandrasekhar's equations; while a 'second approximation' gives a more complicated set of equations. (Author)

AD-619 234 Div. 9/1, 20/1

Chicago Univ., Ill.
THE STABILITY OF A ROTATING LIQUID DROP.
Technical rept.,
by S. Chandrasekhar. 18 Sep 64, 26p
Contract Nonr212124, Proj. NR013 213
Unclassified report

Pub. in the Proceedings of the Royal Society A v286 p1-26 1965 (Copies available only to DDC users).

Descriptors: (*Drops, Rotation), (*Nuclear models, Drops), Liquids, Stability, Surface tension, Tensor analysis, Hydrodynamics, Sequences.

The stability of a rotating drop held together by surface tension is investigated by an appropriate extension of the method of the tensor virial. Consideration is restricted to axisymmetric figures of equilibrium which enclose the origin. These figures form a one-parameter sequence. It is shown that with respect to stability, the axisymmetric sequence of rotating drops bears a remarkable similarity to the Maclaurin sequence of rotating liquid masses held together by their own gravitation. Thus, at a point along the sequence (where $\Sigma = 0.4587$) a neutral mode of oscillation occurs without instability setting in at that point (i.e. provided no dissipative mechanism is present); and the instability actually sets in at a subsequent point (where $\Sigma = 0.8440$) by overstable oscillations with a frequency F. The dependence on Σ of the six characteristic frequencies, belonging to the second harmonics, is determined and exhibited. (Author)

AD-619 236 Div. 25/3

Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
AFTERGLOW STUDIES IN HYDROGEN,
by H. J. Oskam and V. R. Mittelstadt.
20 May 64, 8p
Unclassified report

Pub. in Physica v30 p2021-30 1964 (Copies available only to DDC users). Supported by NSF and ARPA.

Descriptors: (*Glow discharges, Hydrogen), (*Hydrogen, Plasma medium), Excitation, Electrons, Recombination reactions.

The time dependence of the electron density during the afterglow period of plasmas produced in hydrogen was measured by means of the microwave cavity method. This time dependence was found to be exponential during the later part of the afterglow period for pressures smaller than 4.5 torr. The relevant time constant depended on the plasma excitation conditions. The mobility value 13.3 ± 0.5 cm sq/volt second calculated from the measured ambipolar diffusion coefficient is believed to refer to H3(+)ions moving in molecular hydrogen and is in good agreement with the values obtained from time-of-flight studies. The value 16.4 cm sq/volt second obtained with long plasma excitation pulse lengths most probability refers to H(+) ions moving in a mixture of atomic and molecular hydrogen. The studies indicated that one of the hydrogen ions, most probably H3(+) might have a recombination coefficient equal to or larger than 10 to the -7th power cc/s. (Author)

AD-619 242 Div. 25/1
CFSTI Prices: HC$4.00 MF$1.00

Naval Research Lab., Washington, D. C.
A REVIEW OF WORLD CONTRIBUTIONS FROM 1945 TO 1965 TO THE THEORY OF ACOUSTIC RADIATION. CHAPTER I. INTRODUCTION TO THE FUNDAMENTALS OF ACOUSTIC RADIATION,
by S. Hanish. 8 Jun 65, 118p
Rept. no. NRL-MR-1622
Proj. RF001 03 05
Unclassified report

Descriptors: (*Acoustics, Reviews), (*Sound transmission, Reviews), Fluid mechanics, Mathematical analysis, Reports.

AD-619 243 Div. 25/2, 30/3

Kansas Univ., Lawrence. Dept. of Chemistry.
INFINITE SLIT HEIGHT CORRECTIONS IN SMALL ANGLE X-RAY SCATTERING,
by B. Chu and D. M. Tan Creti. 21 Aug 64, 2p
AROD 4089:3
Unclassified report

Pub. in Acta Crystallographica v18 pt6 p1083-4 Jun 1965(Copies available only to DDC users).

Descriptors: (*X-ray diffraction analysis, Collimators), Corrections.

AD-619 250 Div. 8/6, 8/2, 2/7
CFSTI Prices: HC$3.00 MF$0.75

Centre National D'Etudes Des Telecommunications (France).
STUDY OF VLF RADIATION BY USE OF A NIKE-CAJUN ROCKET.
Technical rept.,
by Claude Renard and Christian Fayard. 15 Apr 65, 63p Rept. no. CNET-345-TC
Contract AF61 052 571
AFCRL 65-564

Unclassified report

Descriptors: (*Sounding rockets, Probes(Electromagnetic)), (*Probes(Electromagnetic), Sounding rockets), (*Radio fields, Ionospheric propagation), (*Ionospheric propagation, Radio fields), Very low frequency, Radio waves, Ionosphere, Magnetic fields, Electron density, Doppler effect, Telemeter systems, Radio equipment, Geophysics.

The payload of a NIKE CAJUN rocket launched at Wallops (Virginia) consisted of equipment developed to measure the magnetic field in the ionosphere of a VLF wave radiated by the Annapolis transmitter (NSS) on 22,3 kc/s. After the measurement principles have been exposed, a detailed description of the equipment is given and the telemetry results are analysed. In spite of an antenna effect on the loops, an approximate measure of the VLF field in the whistler mode between the D and E layers is given. An analysis of the propagation above Wallops-Island is carried out, which allows the development of the processing of the Doppler effect observed on the VLF wave received in the ionosphere. The electron density profile obtained between 70 and 100 km is analysed and shows two layers at 78 and 87 km. (Author)

AD-619 256 Div. 25/2, 25/6, 20/2
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
ACTA PHYSICA SINICA, VOL. 20, NO. 3, 1964: TABLE OF CONTENTS AND ABSTRACTS.
Apr 65, 9p Rept. no. E-TC-Ch-65-33
Contract AF19 628 5073
TT 65-62895 Unclassified report
Abstract trans. of Wu Li Hsueh Pao (Chinese People's Republic) v20 n3 p193-288 1964.

Descriptors: (*Physics, China), Scientific research, Abstracting, Ferromagnetism, Nuclear scattering, Resonance scattering, Ferromagnetic materials, Single crystals, Nuclear physics, Acoustics, Solid state physics.

Contents: The interaction between conduction electrons and spin waves in a ferromagnet; low-energy pion-nucleon scattering; the second resonance in pi-N elastic scattering; the sound field of a plane radiator; s-wave pi-pi scattering; the intensity of the absorption bands of ruby; an approximate solution of Hill's equation in problems dealing with an isochronous cyclotron; and the effect of heat treatment on the ferromagnetic resonance of lutecium iron garnet and manganese ferrite single crystals.

AD-619 272 Div. 25/6
CFSTI Prices: HC$5.00 MF$1.00

Measurement Analysis Corp., Los Angeles, Calif.
RESPONSE OF ELASTIC STRUCTURES TO DETERMINISTIC AND RANDOM EXCITATION.
Final rept. for Mar-Nov 64,
by R. L. Barnoski. May 65, 164p
Rept. no. MAC-403-04
Contract AF33 615 1418, Proj. 1370, Task 137005
FDL TR-64-199 Unclassified report

Descriptors: (*Structures, Elasticity), (*Vibration, Structures), Beams(Structural), Aerospace craft, Stresses, Fatigue(Mechanics), Failure(Mechanics), Loading(Mechanics), Harmonic oscillators, Damping, Fourier analysis, Continuum mechanics, Probability.

The fundamental classical theory governing the response of linear distributed elastic structures to deterministic and to random excitation. A review is made of the basic dynamics theory for discrete and distributed systems when the excitation is deterministic. Integral expressions are derived for the mean square value and correlation functions for the response of an arbitrary linear elastic structure subjected to stationary random loading. The value and limitations of using classical theory as a tool for predicting structural vibrations in typical flight vehicles are explored. The theoretical results for distributed structures subjected to stationary random excitation are noted to yield complicated analytical expressions even for uniform beams. The direct extension of the shown theoretical results to include typical flight structures, although technically accurate, is not considered practical. The derivation procedures and results can be used as a basis for forming statistical parametric techniques for approximating the response behavior of distributed systems to random excitation. Several existing techniques reflecting compromises in theoretical rigor are discussed and subject areas for future study are noted. (Author)

AD-619 273 Div. 25/1, 25/6, 8/2
CFSTI Prices: HC$2.00 MF$0.50

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
PHONON INTERACTIONS IN CRYSTALS.
Quarterly progress rept. no. 8, 15 Feb-14 May 65,
by N. S. Shiren, M. Pomerantz, and R. J. von Gutfeld.
14 May 65, 33p
Contract DA36 039AMC02280E, Proj. P6 22001A056
Unclassified report

See also AD-615 960.

Descriptors: (*Masers, Phonons), (*Microwaves, Acoustics), (*Phonons, Crystals), Ultrasonic radiation, Gain, Absorption, Signals, Velocity, Theory, Attenuation, Germanium, Gallium, Propagation, Scattering, Bismuth, Antimony.

The signal velocity of MASER amplified 16.45 Gc/sec ultrasonics was measured. The measured velocity was unchanged (within ±1%) from the off resonance value. Gains of as much as 23 db were obtained. The observed velocity change for 15 db absorption was 15%. A qualitative theory of signal velocity was derived and is in agreement with the observations. The attenuation of microwave phonons due to interaction with Ga acceptors in Ge was observed. All the transverse and longitudinal waves propagating on the (100) and (110) directions show effects due to the impurities. Heat pulses were observed in Bi, Sb and germanium at about 4K. Preliminary data on Bi and Sb leaves the question of whether electrons or phonons are the principal heat carriers unanswered. Heat pulse data for intrinsic germanium indicate that there is considerable phonon scattering though individual phonon modes are distinguishable. (Author)

AD-619 277 Div. 25/1
CFSTI Prices: HC$1.00 MF$0.50

TRACOR, Inc., Austin, Tex.
AN ANALYTICAL SOLUTION TO THE SOUND PRESSURE FIELD RESULTING FROM A PLANE WAVE INCIDENT ON AN ELLIPTIC CYLINDER AND A RIGHT CIRCULAR CYLINDER.
Technical memo.,
by P. G. Hedgcoxe. 17 Feb 65, 14p
Document no. TRACOR-64-117-U
Contract N0bsr91229, Proj. SF001 03 01, Task 8100
Unclassified report

Descriptors: (*Sound, Pressure), (*Transducers, Sound), (*Boundary value problems, Wave transmission), Cylindrical bodies, Field theory, Sonar domes.

The purpose of this memorandum is to describe an analytical method for obtaining the sound pressure field due to a plane wave incident on a complex consisting of an infinite length elliptical ('nearly straight') baffle and an infinite length right circular cylinder. The problem is formulated so that the baffle shields the cylinder from the incident plane wave. The model used for this boundary value problem is a generalization of a previous concentric baffle model used for studying the interaction of the sonar baffle and transducer with screw noise. The analytical results are presented in a form suitable for computing the total sound pressure at the transducer (cylinder) face as well as the incident and reflected portions of the field solution there.

AD-619 278 Div. 9/1, 4/4
CFSTI Prices: HC$2.00 MF$0.50

Rensselaer Polytechnic Inst., Troy, N. Y.
THE FLOW OF A DISSOCIATING GAS PAST A CONVEX CORNER. PART I. LINEARIZED THEORY.
Interim technical rept.,
by Thirukurungudi R. Sundaram. May 65, 44p

Contract AF33 615 1080, Proj. 7064
ARL 65-106

Unclassified report

Descriptors: (*Gas flow, Convex bodies), (*Partial differential equations, Gas flow), Dissociation, Gases, Perturbation theory, Nonequilibrium flow, Kinetic theory.

The equations describing the flow of a dissociating gas past a convex corner are linearized and combined to give a single partial differential equation for the pressure perturbation. In this equation the chemical relaxation time is defined explicitly, and arbitrariness in the definition of this parameter is avoided. It is shown that the solutions of this linear equation agree with exact numerical solutions only when the flow-deflection angle is very small. In particular, the agreement with the exact calculations of Cleaver for a flow deflection angle of five degrees is already quite poor. An important conclusion is that the linear theory for the flow of a dissociating gas, when applied to bodies of variable slope, such as airfoils, is much more severely restricted than previously realized. (Author)

AD-619 279 Div. 25/6, 7/5
CFSTI Prices: HC$4.00 MF$1.00

Eagle-Picher Research Labs., Miami, Okla.
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.
Final rept. for 1 Mar 62-28 Feb 65,
by Lloyd W. Brown, John T. Buford, R. H. Fahrig, A. L. Fluesmeier, and John R. Musgrave. May 65, 131p
Contract AF33 657 7127, Proj. 7885, Task 788503
ARL 65-100

Unclassified report

See also AD-276 416.

Descriptors: (*Semiconductors, Purification), (*Crystal growth, Semiconductors), (*Synthesis(Chemistry), Semiconductors), Cadmium, Zone melting, Cadmium compounds, Sulfides, Cadmium alloys, Selenium alloys, Zinc compounds, Zinc alloys, Tellurium alloys, Mercury compounds, Mercury alloys, Barium alloys, Impurities, Oxides, Single crystals, Energy conversion.

The preparation and purification of elemental cadmium by zone refining are described. A comparison of the emission and mass spectrographic results on the zoning of a doped cadmium test bar is presented. The syntheses of high purity cadmium sulfide, cadmium selenide, zinc sulfide, and zinc selenide by the direct reaction of their gaseous elemental constituents are discussed. Emission and mass spectrographic data on synthesized cadmium sulfide are compared. The syntheses of zinc telluride, mercuric sulfide, mercuric selenide, and mercuric telluride by the combination of the elements in the liquid phase are outlined. A method for preparing barium telluride by the reduction of barium tellurate is given. Special handling techniques and x-ray characterization of this material are presented. Crystal growth of cadmium sulfide, zinc sulfide, cadmium selenide, zinc selenide, and mixed crystals of zinc sulfide-zinc selenide from the melt in a high pressure furnace is discussed. Doping of melt grown crystals is described. A discussion of the crystal growth of cadmium sulfide, zinc sulfide, and cadmium oxide by vapor phase techniques is presented. (Author)

AD-619 289 Div. 25/6
CFSTI Prices: HC$1.00 MF$0.50

Philco, Blue Bell, Pa. Applied Research Lab.

ON THE PHOTOIONIZATION OF DEEP IMPURITY CENTERS IN SEMICONDUCTORS,
by G. Lucovsky. 1965, 10p
Contract Nonr484800

Unclassified report

Descriptors: (*Semiconductors, Impurities), (*Crystal lattice defects, Ionization), Photochemistry, Probability, Silicon, Indium, Atomic energy levels, Absorption, Excitation.

The wavelength dependence of the photoionization cross section for deep, semiconductor impurity centers, e.g., In doped Si, is calculated using a model in which the ground state wave function is determined solely by a suitable short range ion core potential. Absorption to excited states is explained by a long range, unperturbed coulomb potential. (Author)

AD-619 290 Div. 25/5, 25/6
CFSTI Prices: HC$4.00 MF$0.75

Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering.
THE WAVEVECTOR DEPENDENT SPIN SUSCEPTIBILITY OF AN INTERACTING ELECTRON GAS.
Technical rept.,
by Donald Robert Hamann. 14 May 65, 111p
Rept. no. TR-2
Contract Nonr184172

Unclassified report

Descriptors: (*Electrical conductance, Field theory), (*Nuclear spins, Field theory), Electric moments, Electrons, Gases, Hamiltonian, Integral equations, Green's function, Fermions, Antiferromagnetism, Metals, Paramagnetic materials, Quantum mechanics, Atomic energy levels.

The wavevector dependent spin susceptibility of an electron gas, which is relavent to the stability of the paramagnetic state and to indirect exchange effects was studied. The theory of the susceptibility is derived in the linearized Hartree-Fock approximation, and this simple theory is used to investigate the susceptibility of a Fermion system with statically screened interactions for a wide range of screening lengths and densities. An effective Hamiltonian formulation is derived to deal with the dynamic screening effects of electron correlations. The self-energy of the dressed electron states described by this Hamiltonian is evaluated in the vicinity of the Fermi surface. The theory of the susceptibility including correlation effects is derived, and the susceptibility functions are calculated for the electron gas at a number of densities in the metallic region and one in the high density region. It is found that the electron correlations remove the instability of the paramagnetic state relative to infinitesimal antiferromagnetic deformations found by Overhauser in the Hartree-Fock approximation. (Author)

AD-619 305 Div. 25/6, 30/5
CFSTI Prices: HC$2.00 MF$0.50

New Mexico Univ., Albuquerque. Bureau of Engineering Research.
PRELIMINARY STUDY OF PURE SHEAR FRACTURE MODEL.
Technical rept.,
by F. D. Ju and J. G. Baker. May 65, 44p
Rept. no. ME-13
Grant AF AFOSR568 64
AFOSR 65-1195

Unclassified report

Descriptors: (*Fracture(Mechanics), Shear stresses),

(*Metals, Shear stresses), Deformation, Strain-(Mechanics), Test methods, Configuration, Test equipment.

A specimen configuration that is expected to yield a near pure shear state of strain (in its critical section throughout the deformation range up to fracture) was designed. Qualitative results are presented. Preliminary indications are that the specimen satisfactorily meets the requirements.

AD-619 308 Div. 9/4
CFSTI Prices: HC$3.00 MF$0.75

Cornell Univ., Ithaca, N. Y. Sibley School of Mechanical Engineering.
AN ANALYTIC STUDY OF FILM BEHAVIOR IN HORIZONTAL ANNULAR TWO-PHASE FLOW.
Technical rept.,
by R. H. Pletcher and H. N. McManus, Jr. 30 Apr 65, 89p
Grant DA ARO D31 124G188, Proj. 3199E
Unclassified report

Descriptors: (*Liquids, Fluid flow), (*Films, Fluid dynamic properties), Shear stresses, Partial differential equations, Stability, Surface properties, Injection, Laminar flow, Three-dimensional flow, Mathematical analysis, Computers.

The behavior of a thin liquid film originally of annular cross-section was examined insofar as depth and velocity field were concerned when the film was exposed to high shear on the free surface and the action of gravity. The applicable equations were developed from the Navier-Stokes set, and include the terms necessary for cross flow of the fluid. These equations were resolved by formulating the equivalent finite-difference forms and effecting a numerical solution. The film behavior was determined when the surface was subjected to various stimuli, e.g., surface shear a function of film depth, surface cross shear, etc. Solutions were effected for several combinations of liquid flow and surface shear in a horizontal tube two inches in diameter. The results obtained compare favorably with experimental measurements both from a qualitative and quantitative view. The scaling laws, which permit the several solutions presented to be extended to a whole family of flows, are presented and discussed. The techniques of solution developed are believed applicable to a wide variety of free surface flow problems. (Author)

AD-619 313 Div. 25/6, 4/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
A FEW CHEMICAL METHODS OF DETECTING THE CONDUCTIVITY TYPE OF SEMICONDUCTORS,
by Chen-Kun Chia. 27 Jul 65, 13p
Rept. no. FTD-TT-64-1340
TT 65-62918
Unclassified report

Edited trans. of Hua Hsueh T'ung Pao (Chinese People's Republic) n2 p38-40 1963.

Descriptors: (*Semiconductors, Chemical analysis), Electrical conductance, Determination, Silicon, Germanium, Hydrogen compounds, Fluorides, Nitric acid, Copper, Gold, Silver, Chemical precipitation, Electrolysis, Etched crystals, China.

Several methods are given for determining the type of conductivity and location of P-N junctions in silicon and germanium semiconductors. These techniques are: Staining with HF; staining with HF-HNO3; preferential precipitation of Cu; preferential precipitation of Au; preferential precipitation of Ag; Electrolytic action; anodic etching.

AD-619 317 Div. 25/4
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CRYSTAL LIGHT MODULATOR,
by A. S. Nakonechnyi. 11 Aug 65, 5p
Rept. no. FTD-TT-65-527
TT 65-62922 Unclassified report

Unedited rough draft trans. of Russian patent 166384, pub. 12 Jul 63, appl. 847083/26-25.

Descriptors: (*Light, Modulation), Prisms(Optics), Electrodes, Crystals, USSR, Patents.

Object of the Invention: The crystal light modulator is distinguished by the fact that, with the aim of lowering the voltage in order to obtain a variable movement between an ordinary and extraordinary ray, it uses a multilayered prism made of crystal plates, which are staggered with electrodes. (Author)

AD-619 320 Div. 25/6, 25/2, 25/3
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CERTAIN PROBLEMS OF THE PHYSICS OF SEMICONDUCTORS,
by B. M. Vul. 28 Jul 65, 12p Rept. no. FTD-TT-65-537,
TT 65-62925 Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Vestnik, v44 n8 p65-70 1964.

Descriptors: (*Semiconductors, Electrical properties), (*Crystal growth, Impurities), Electrical conductance, Electron transitions, Valence, Paramagnetic resonance, Ionization potentials, Crystal lattice defects.

The electrical structure of semiconductors is discussed. Electron paramagnetic resonance is treated in semiconductors. The problem of low temperature flash-over in semiconductors is considered.

AD-619 323 Div. 9/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
PRODUCING HIGH-VELOCITY GAS JETS,
by A. E. Voitenko. 4 Aug 65, 10p
Rept. no. FTD-TT-65-542
TT 65-62928
Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady, v158 n6 p1278-80 1964.

Descriptors: (*Plasma jets, Production), USSR, Velocity, Shock waves, Detonation waves, Gases, Jets, Pressure, Compressed air.

The article presents a method for producing high-velocity plasma jets.

AD-619 325 Div. 9/1, 4/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.

SOLVING A LINEARIZED AXIALLY-SYMMETRICAL PROBLEM OF POINT EXPLOSION IN A MEDIUM WITH VARIABLE DENSITY,
by V. P. Karlikov. 29 Jul 65, 9p
Rept. no. FTD-TT-65-557
TT 65-62930

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR, Doklady v101 n6 p1009-12 1955.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Explosions, Gases), Differential equations, Mathematical analysis, Axially symmetric flow, Dynamics, Shock waves, USSR.

AD-619 326 Div. 25/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
ON THE POSSIBLE GENERATION OF NEGATIVE TEMPERATURES IN A DOPED SEMICONDUCTOR UNDER STATIONARY EXCITATION,
by A. A. Kolesnikov and Z. I. Uritskii.
29 Jul 65, 7p Rept. no. FTD-TT-65-561
TT 65-62931

Unclassified report

Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Fizika (USSR) n2 p171-3 1964.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Semiconductors, Cooling), Crystal lattice defects, Low-temperature research, Atomic energy levels, Photoelectric effect, Excitation, Illumination, Electron transitions, Probability, USSR.

It is shown that by experimentally determining the magnitude of the kinetic coefficient of the transition from the i-th level to the L-th level, and probability of elementary radiation transition at a frequency where i>1, it is possible to evaluate the possibility of creating negative temperatures in semiconductors in a stationary regime of lighting.

AD-619 327 Div. 25/3
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
PROBLEM OF SCATTERING OF ELECTROMAGNETIC WAVES ON AN UNEVEN SURFACE,
by Yu. P. Lysanov. 5 Aug 65, 9p
Rept. no. FTD-TT-65-568
TT 65-62933

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR, Doklady, v87 n5 p719-22 1952.

Descriptors: (*Electromagnetic wave reflections, Surfaces), (*Surfaces, Electromagnetic wave reflections), Electrical conductance, Dielectric properties, Scattering, Fourier analysis.

The problem of the scattering of plane electromagnetic waves on an absolutely conductive uneven surface is solved. A generalization is given of the solution of the problem for the case where the lower medium is characterized by the final conductivity C and the complex dielectric constant e. In this case the coefficient of reflection will be a function of the angle of incidence, or, since the surface is uneven, a function of a point of the surface.

AD-619 330 Div. 25/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
LOSS IN STABILITY OF SHELLS OF ROTATION UNDER INTERNAL PRESSURE,
by A. V. Pogorelov. 5 Aug 65, 7p
Rept. no. FTD-TT-65-588
TT 65-62936

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady, v159 n6 p1247-8 1964.

Descriptors: (*Bodies of revolution, Stability), (*Convex bodies, Deformation), Structural shells, Boundary value problems, Pressure, USSR.

AD-619 332 Div. 25/6, 13/4, 17/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
ELLIPTICAL HOLE WITH CRACKS,
by A. O. Kaminskii. Aug 65, 9p
Rept. no. FTD-TT-65-600
TT 65-62938

Unclassified report

Unedited rough draft trans. of Akademiya Nauk URSR, Kiev. Dopovidi, n10 p1301-5 1964.

Descriptors: (*Metal plates, Fracture(Mechanics)), (*Fracture(Mechanics), Metal plates), Brittleness, Stresses, Elasticity, Numerical analysis, USSR.

The author considers the problem of the brittle breakdown of a plate weakened by an arbitrary elliptical hole with two balanced cracks in the case of 'all-round' tension of a plate. G. I. Barenblatt's method was used to obtain a formula for the determination of the value of the critical load. (Author)

AD-619 342 Div. 25/4, 24/2, 12/1, 2/4
CFSTI Prices: HC$2.00 MF$0.50

Air Force Cambridge Research Labs., Bedford, Mass.
A LASER FOR AN EARTH-BASED SATELLITE ILLUMINATOR.
Instrumentation papers,
by Robert L. Iliff. Jun 65, 26p
Rept. nos. AFCRL 65-442, IP-70
Proj. 7600, Task 760006

Unclassified report

Descriptors: (*Lasers, Photographic lighting systems), (*Photographic lighting systems, Lasers), (*Satellites-(Artificial), Photography), Light pulse, Reflection, Photographic recording systems, Navigation satellites, Position finding, Celestial navigation, Phototubes, Optical equipment, Ruby, Crystals, Geodesy.

A 250-joule, liquid-nitrogen cooled, ruby laser has been used to illuminate a specially equipped satellite, Explorer 22, with sufficient intensity to photograph the cube corner reflectors located on the satellite. The laser system including the photoreceiver is described. A simple method of aligning the optic axis with a known azimuth is presented. Some laser experiments designed to lengthen the lifetime of the laser and to optimize the output energy are also given. (Author)

AD-619 351 Div. 25/2, 15/1

New York Univ., N. Y. Dept. of Physics.
SPACE GROUP THEORY AND LATTICE DYNAMICS,
by Joseph L. Birman. 1964, 13p
Contract AF33 657 11057; Grant DA ARO31G424
AROD 4054:2

Unclassified report

Pub. in Lattice Dynamics proceedings of the International Conference held at Copenhagen, Denmark p669-80 Aug 5-9 63 (Copies available only to DDC users).

Descriptors: (*Crystal lattices, Dynamics), (*Groups-(Mathematics), Crystal lattices), Vibration, Symmetry-(Crystallography), Matrix algebra, Selection rules, Infrared radiation, Diamond.

The major applications of group theory in lattice dynamics result from the assertion that the lattice normal modes are bases for the irreducible representations of the space group. The construction of character tables for the irreducible representations in diamond is illustrated, and certain tables are presented, which have been used in deriving reduction coefficients and selection rules for infrared and Raman processes in diamond. A brief remark is made on the use of tables of coupling coefficients for the construction of lattice invariants and covariants, which are being used in a theory of infrared lattice vibration absorption. (Author)

AD-619 362 Div. 25/7

University of Western Ontario, London. Dept. of Physics.
INTERPOLATION OF FRANCK-CONDON FACTORS,
by R. W. Nicholls. 1964, 3p
Contract AF19 628 2820; Grant AF AFOSR62 236
Proj. 9768, Task 976801
AFOSR 65-1085

Unclassified report

Pub. in Nature v204 n4956 p373 Oct 24 1964.

Descriptors: (*Molecular properties, Electron transitions), (*Band spectrum, Intensity), Molecular spectroscopy, Molecular structure, Heat transfer.

Magnitude estimates of Franck-Condon factors may be used for definitive identification of molecular bands or band systems, or for estimates of radiative heat transfer from hot gases. An interpolation of them allows a simple means of making such estimates. A transition parameter t which varies from band to band and which may be used for interpolation is therefore required in order that plots of the factors versus t can be made for each band of interest. The method of deriving an approximation for t is shown. (Author)

AD-619 371 Div. 9/1
CFSTI Prices: HC$2.00 MF$0.50

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
VISCOUS FLOW.
Final summary rept.,
by John D. Buckmaster. Aug 65, 46p
Rept. no. CAL-AF-1285-A-16
Contract Nonr265300

Unclassified report

Descriptors: (*Viscosity, Fluid flow), (*Fluid flow, Viscosity), Hypersonic flow, Boundary layer, Angle of attack, Reynolds number, Stagnation point, Sound signals, Transport properties, Kinetic theory, Specific heat, Thermal diffusion.

A summary is presented of the work done in the areas of hypersonic viscous flows, boundary layer stability, dispersion effects of chemical relaxation, separated flows, flows with radiation, and the assumption of a specific heat ratio hear unity.

AD-619 391 Div. 25/6
CFSTI Prices: HC$1.00 MF$0.50

North Carolina State Univ., Raleigh.
MATHEMATICAL ANALYSIS OF RESONANT OSCILLATIONS.
Final rept. for 15 Jul 64-14 Jul 65,
by Raimond A. Struble. 10 Aug 65, 2p
Grant DA ARO D31 124 565
AROD 4105:15 Unclassified report

Descriptors: (*Resonance, Oscillations), (*Oscillations, Mathematical analysis).

Research activity on mathematical analysis of resonant oscillations is summarized. Project publications and technical reports are listed.

21. Propulsion and Fuels

AD-618 818 Div. 10/6

Canadian Armament Research and Development Establishment, Valcartier (Quebec).
NONLINEAR AXIAL COMBUSTION INSTABILITY IN SOLID PROPELLANT MOTORS,
by W. G. Brownlee. 20 Nov 63, 10p
Unclassified report

Presented at AIAA Summer Meeting, Low Angeles, Calif., 17-20 Jun 63, as AIAA Preprint 63-228. Pub. in AIAA Journal v2 n2 Feb 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Rocket motors(Solid propellant), Combustion), (*Combustion, Stability), Nonlinear systems, Pressure, Solid rocket propellants, Rocket propellant grains, Isocyanate plastics, Ammonium compounds, Perchlorates, Aluminum alloys, Lithium compounds, Fluorides, Fuel additives, Canada.

Nonlinear axial combustion instability occurs when one or more strong gaseous compression waves propagate longitudinally within a solid propellant rocket motor. The nonlinear unsteady flow field derives energy through interaction with the combustion process and causes an increase in the time-averaged burning rate, pressure, and thrust. This behavior has been investigated using polyurethane-ammonium perchlorate propellanta and some 200 motors in the size range 2-in.-diam by 10-in.-long to 17-in.-diam by 180-in.-long. Reproducible results were obtained. The motors were found to be linearly stable and nonlinearly unstable with respect to initiation of instability. Thus, normal proof firings are unlikely to detect inherent instability, since a flow disturbance of finite amplitude is required to trigger the system. A pulse injection method of triggering was applied to all firings. As operating pressures increased above a critical value P the motors became capable of instability, the severity increasing monotonically with the restriction ratio. The effect on the critical value of changing the motor scale, length to diameter ratio, grain cross section, grain temperature, and of adding aluminum alloy and lithium fluoride to the propellant was determined. (Author)

AD-619 012 Div. 27/2, 9/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CERTAIN FEATURES OF SUPERSONIC FLOW IN ACTIVE GRIDS: FORMATION OF SUPERSONIC FLOW AT THE ENTRANCE TO THE GRID OF THE PROFILES, THE CONDITION OF PERIODICITY OF THE FLOW IN FRONT OF THE GRID,
by A. V. Gubarev and V. E. Deich. 23 Jul 63, 16p
Rept. no. FTD-TT-61-545
TT 65-62828
Unclassified report

Unedited rough draft trans. of Nauchnye Doklady Vysshei Shkoly. Energetika (USSR) n2 p163-70 1958.

Descriptors: (*Supersonic flow, Turbines), (*Turbines, Supersonic flow), USSR, Mathematical analysis, Configuration, Nozzles.

Supersonic flow at the entrance to an isulated grid with an infinite number of profiles can take place at only one inflow angle, which depends on the radius of curvature and the inclination of the back of the profile to the front of the grid and on the number M1. When the entrance angle of the supersonic flow into a non-insulated grid is arbitrary, periodicity of the flow is only observed in an interval which is a multiple of the pitch of the grid guide. For this reason when the stages of the turbine are designed for supersonic flow velocities, it is necessary to consider the working grid together with the nozzle apparatus, and during experimental research it is necessary to make the flow in the nozzle and working vane system periodic. When the velocities at the entrance to the grid are supersonic, the outflow angle depends on the inflow angle. The deviation of the flow in an oblique cut can be calculated by standard formulas only under 'cut-off' conditions. Non-jump flow in the channel of the grid can be made to occur with an intervane channel of greater width than would appear from Meyer's solution for an insulated curvilinear wall. (Author)

AD-619 015 Div. 27/2, 14/5
CFSTI Prices: HC$2.00 MF$0.50

Fairchild Hiller Corp., Bay Shore, N. Y. Stratos Div.
APPLICATION OF A POWDER LUBRICATION SYSTEM TO A GAS TURBINE ENGINE.
Rept. for Jun-Dec 63,
by S. Wallerstein. Jun 65, 29p
Contract AF33 657 8625, Proj. 3044, Task 304401
APL TR-65-43
Unclassified report

Descriptors: (*Gas turbines, Lubrication), (*Graphited materials, Powders), (*Powders, Lubricants), Cadmium compounds, Oxides, Feasibility studies, Mixtures, Bearings, Jet engines.

The study indicates a favorable aspect toward the feasibility of incorporating an integral powder lubrication system into a gas-turbine engine. Such a system could use a mixture of 83.3 percent graphite and 16.7 percent cadmium oxide (by weight) with an air carrier in the ratio of approximately 20 parts of air to 1 part powder. Engine bleed air at a rate of 3 percent engine flow rate should be sufficient for carrier gas at all altitudes. Powder would be dispensed and metered through air eductors (venturi tubes). Reclamation of spent lubricant is not considered in this system. (Author)

AD-619 067 Div. 10/6, 10/7, 4/4
CFSTI Prices: HC$2.00 MF$0.50

Stanford Research Inst., Menlo Park, Calif.
IGNITION OF SIMULATED PROPELLANTS BASED ON AMMONIUM PERCHLORATE.
Interim rept.,
by Willis A. Rosser, Norman Fishman, and Henry Wise.
30 Jul 65, 37p Rept. no. PU-3573
Contract Nonr341500, Proj. NR092 507
Unclassified report

Descriptors: (*Solid rocket propellants, Ignition), (*Ammonium compounds, Perchlorates), (*Ignition, Solid rocket propellants), Models(Simulations), Catalysts, Copper compounds, Chromium compounds, Oxides, Solid rocket propellant oxidizers, Furnaces, Pressure, Pellets, Nitrogen, Helium, Argon, Reaction kinetics, Carbon.

The ignitability of simulated solid propellants based on NH4C1O4 was studied using the radiation from an arc image furnace as a source of ignition energy. The experimental measurements provide (for given conditions) the minimum time of exposure to radiation required for ignition and combustion of pellets pressed from powdered mixtures of : NH4C1O4 and copper chromite; NH4C1O4, carbon, and copper chromite; and NH4C1O4, copper chromite, and polyethylene.

Minimum exposure times were determined as a function of pellet composition, flux (20 to 120 cal/sq cm sec), pressure (1 to 40 atm), and composition of the atmosphere (N2, He, A) in contact with the pellet. The experimental results in conjunction with supplementary kinetic information indicate that, for these materials, gas phase ignition need not be preceded by a catastrophic rate of heat release within the sample. The critical chemical species involved during gas phase ignition is probably perchloric acid. Under some circumstances, a high rate of solid reaction does appear to be involved during ignition of the materials. (Author)

AD-619 079 Div. 27/2, 30/2
CFSTI Prices: HC$3.00 MF$0.75

Cincinnati Univ., Ohio. Dept. of Aerospace Engineering.
A COMPUTER PROGRAM FOR THE DETAILED DESIGN OF FREE VORTEX TURBINES.
Technical rept.,
by R. Wysong and W. Tabakoff. Jul 65, 81p

Rept. no. D-As-E-TR-651 Unclassified report

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Descriptors: (*Turbines, Design), (*Programming-(Computers), Turbines), Vortices, Specific heat, Thermodynamics, Theory, Gas turbines, Aircraft engines.

A Fortran program has been written for the detailed design calculations of a free vortex turbine having a maximum of four stages. The thermodynamic calculations are based on use of a constant, average specific heat ratio for each stage; thus the program is applicable to any working fluid for which the thermodynamic data are sufficiently well known. The input to the program consists of data obtained from desired cycle objectives, preliminary sizing calculations and flowpath, thermodynamic properties of the working medium, and certain parameters whose values are left to the designer's judgement and experience. A detailed discussion of the pertinent theory, calculation procedure, and general logic of the program has been included as well as an explanation of how the program results fit into the overall design of an aircraft gas turbine engine. In addition, some comments on justification of the need for the program are made. (Author)

AD-619 091 Div. 10/7, 27/2, 4/4
CFSTI Prices: HC$3.00 MF$0.75

General Applied Science Labs., Inc., Westbury, N. Y.
RESEARCH STUDIES FOR SUPERSONIC COMBUSTION.
Technical rept.,
by J. Tamagno. Mar 65, 57p Rept. no. GASL-TR-518
Contract AF49 638 991, Proj. 9711, Task 971101
AFOSR 65-1311

Unclassified report

Descriptors: (*Ramjet engines, Combustion), (*Combustion, Supersonic characteristics), (*Supersonic flow, Combustion), Hydrogen, Air, Reaction kinetics, Diffusion, Control systems, Transport properties, Hypersonic flight, Flame propagation.

A summary is presented of research on supersonic combustion conducted during a 4 year period by GASL. The research discussed is oriented toward fuels and conditions pertaining to supersonic combustion in ramjet engines. Fields encompassed are (1) reaction kinetics of a hydrogen air system, (2) diffusion and combustion of reacting gases, and (3) the testing of highly idealized combustion processes. Studies in the latter field indicate the speed range for supersonic combustion ramjets can be lowered to the 3-6 Mach number range. It is concluded that sufficient progress has been made on the understanding and analysis of supersonic combustion processes to give a sound basis for application to the design of a practical ramjet engine. (Author)

AD-619 247 Div. 10/6, 25/6
CFSTI Prices: HC$4.00 MF$0.75

Firestone Flight Sciences Lab., Calif.
Inst. of Tech., Pasadena.
SOLID ROCKET STRUCTURAL INTEGRITY ABSTRACTS. VOLUME II., NO. 3.
ed. by R. A. Westmann. Jul 65, 114p
Contract AF04 611 9572, Proj. 3059

Unclassified report

See also AD-614 484.

Descriptors: (*Solid rocket propellants, Physical properties), Propellant grains, Mechanical properties, Symposia, Thermal properties, Optical properties, Test methods, Failure(Mechanics), Chemical properties, Bibliographies, Reviews, Abstracting.

Abstracts are given in the following groupings: mechanical characterization, thermal characterization, optical characterization, analytical methods, failure, special test procedures, phisico-chemical effects on mechanical behavior. Also included are two full-length papers: Propellant grain structural integrity problems-engineering status, by J. E. Fitzgerald; and Summary of the International Conference on the Mechanics and Chemistry of Solid Propellants', by G. H. Lindsey.

AD-619 347 Div. 10/7, 22/6
CFSTI Prices: HC$1.00 MF$0.50

Picatinny Arsenal, Dover, N. J.
EVALUATION OF THE THERMAL EFFECTS OF THE INITIAL STAGE OF THE COMBUSTION OF POWDERS AND EXPLOSIVES.
Technical memo.,
by V. M. Maltsev and P. F. Pokhil. Aug 65, 10p
Rept. no. TM-1669
TT 65-62948

Unclassified report

Trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n2 p173-4 1963.

Descriptors: (*Explosive materials, Combustion), (*RDX, Combustion), Powders, Thermal properties, Flames, USSR.

The temperature and absorbing capacity at the height of the flame flare of a secondary explosive - hexogene - was measured at various pressures. The quantity of heat liberated at the initial stage of combustion of the powder and its role in the balance of the heat entering into the heating of the powder in the process of combustion, considerably exceeds the quantity and role of the heat being liberated in the reaction layer of the condensed phase in the combustion of hexogene, at least in the region of pressures investigated. (Extracted)

AD-619 390 Div. 10/7, 27/2, 9/1, 9/5
CFSTI Prices: HC$3.00 MF$0.75

General Applied Science Labs., Inc., Westbury, N. Y.
MIXING PROCESSES IN SUPERSONIC COMBUSTION,
by Antonio Ferri, Gino Moretti, and Simon Slutsky.
1964, 90p
Contracts AF49 638 991, AF 33 657 10463
AFOSR 65-1310; N65 18480

Unclassified report

Prepared in cooperation with New York Univ., N. Y.
Contract NAS8 2686.

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Descriptors: (*Combustion, Superaerodynamics), (*Superaerodynamics, Combustion), Analysis, Chemical reactions, Reaction kinetics, Gas flow, Jet mixing flow, Axially symmetric flow, One-dimensional flow, Two-dimensional flow, Supersonic flow, Hydrogen.

Analytical approaches are reviewed that have been developed in relation to the fluid dynamic and chemical problems of supersonic combustion.

22. Space Technology

AD-618 728 Div. 12/6, 12/1
CFSTI Prices: HC$3.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
TIME HISTORY OF THE MOTION AND STABILITY OF A DUMBBELL SATELLITE IN ORBIT ABOUT A SPHERICAL, ROTATING EARTH.
Master's thesis,
by Donald W. Fresh. Jun 65, 97p
Rept. no. GAM/Mech/65B-6

Unclassified report

Descriptors: (*Satellites(Artificial), Celestial mechanics), (*Celestial mechanics, Satellites(Artificial)), Orbital trajectories, Earth, Rotation, Spheres, Motion, Equations, Spacecraft, Aerodynamic characteristics.

The general three-dimensional equations of motion are derived for an unsymmetrical dumbbell satellite with masses connected by an infinitely rigid, weightless bar. The satellite is spun about its center of mass at a rate sufficient to create an artificial one 'g' environment at the larger mass. The equations of motion are modified using a small perturbation approach to separate the motion of the vehicle from that of an equivalent point mass. Solution of the resulting perturbation equations is accomplished using the IBM 7090-94 Digital Computer System. Results predict a stable orbit and an essentially constant satellite spin rate vector. (Author)

AD-618 729 Div. 12/6, 12/1
CFSTI Prices: HC$5.00 MF$1.00

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN INVESTIGATION OF THE MOTION OF A CABLE CONNECTED DUMBBELL SPACE VEHICLE.
Master's thesis,
by Richard G. Hurlburt and George H. Lamb.
Jun 65, 161p Rept. no. GAW/Mech/65-28

Unclassified report

Descriptors: (*Satellites(Artificial), Celestial mechanics), (*Celestial mechanics, Satellites(Artificial), Spacecraft, Flexible couplings, Cables(Mechanical), Orbital trajectories, Motion, Equations, Aerodynamic characteristics.

The general equations of motion are derived for a flexible vehicle spinning out of the orbital plane, under the influence of a gravity gradient. The vehicle consists of two unequal point masses connected by a flexible cable of uniformly distributed mass. The transverse and axial vibrations of the cable are assumed decoupled. A Lagrangian for continuous and discrete systems is used to derive the partial differential - integral equations of motions. A separation of variables is used to express the transverse equations of motion in terms of natural modes and normal coordinates. A method for obtaining numerical results is presented. (Author)

AD-618 749 Div. 9/1, 15/1, 13/4
CFSTI Prices: HC$2.00 MF$0.50

Operations Research Center, Univ. of California, Berkeley.
SEMI-NARROW CHANNELS,
by James Bigelow. Jun 65, 26p Rept. no. ORC-65-15
Contract Nonr365602; Grant PHS GM9606

Unclassified report

Descriptors: (*Particles, Motion), (*Operations research, Transport properties), Diffusion, Probability, Matrix algebra, Structures.

Consider a channel or passage connecting compartments A and B that is wide enough so that two particles in the channel can pass one another. It is the purpose of this paper to derive the laws governing the flow of particles in either direction through such a channel. The position of a particle in the channel can be found by projecting the centers of all the particles onto the axis of the channel. If a particular point is k from the left, then the particle to whose center the point corresponds is in the kth position. The assumption is that the centers of any two particles will project onto different points of the axis.

AD-618 842 Div. 12/6, 12/1, 16/2, 2/1

Harvard Univ., Cambridge, Mass.
SPACECRAFT STERILIZATION STANDARDS AND CONTAMINATION OF MARS,
by Carl Sagan and Sidney Coleman. 1964, 7p

Unclassified report

Pub. in Astronautics and Aeronautics p22-7 May 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Spacecraft, Purification), (*Mars, Biological contamination), (*Biological contamination, Inhibition), (*Space biology, Mars), Standards, Probability, Mars probes, Microorganisms, Space environmental conditions, Soils, Design.

Heating and cooling are suggested as methods of sterilizing spacecraft. Since sterilization introduces engineering problems, such as decreasing component reliability, it is concluded that the type and duration of sterilization procedure must depend on some estimate of an acceptable risk of planetary contamination. The report provides a means of computing the level of spacecraft sterility as a function of this acceptable risk.

AD-618 900 Div. 12/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE FAMOUS VOSTOK FIRST MANNED SPACE SHIP.
16 Jul 65, 12p Rept. no. FTD-TT-65-763
TT 65-62812

Unclassified report

Unedited rough draft trans. of mono Le Celebre Vostok (Premier Vaisseau Cosmique), n. p. 32p.

Descriptors: (*Manned spacecraft, USSR), (*Astronautics, Manned spacecraft), Space flight, Spacecraft, Design, Operation, Astronauts.

AD-619 028 Div. 12/6, 12/1
CFSTI Prices: HC$3.00 MF$0.75

Colorado Univ., Boulder.
THE PROBLEM OF COTANGENTIAL TRANSFER,
by Nguyen X. Vinh. May 65, 82p
Contract DA31 124ARO D139, Proj. 7071, Task 707103

ARL 65-108

Unclassified report

Presented at the AIAA Aerospace Sciences Meeting (2nd) in New York City, 25-27 Jan 1965.
See also AD-430 481.

Descriptors: (*Orbital trajectories, Geometry), (*Transfer trajectories, Optimization), (*Elliptical orbit trajectories, Transfer trajectories), Velocity, Re-entry vehicles, Numerical analysis, Algebra.

Solution of the optimum cotangential transfer between two coplanar, noncoaxial, elliptical orbits is presented. The characteristic velocity is expressed explicitely in term of a single parameter. By optimizing this function with respect to the variable, a resultant equation which is a high order algebraic equation is obtained. Numerical solution can be calculated to the desired degree of accuracy. Exact analytical solutions are given for all special cases of the terminal conditions. Second order approximate solution which can be applied to a large range of missions (interplanetary transfer, transfer of a satellite from a parking orbit to a high energy elliptical orbit...) is derived and gives an excellent degree of accuracy (less than 1 ft/sec for the characteristic velocity and less than 30' for the position of transfer). (Author)

AD-619 035 Div. 12/6, 12/2, 19/4
CFSTI Prices: HC$4.00 MF$1.00

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
SIMULATION OF A SATELLITE GYROSCOPIC ATTITUDE CONTROL SYSTEM WITH ORBITAL PITCH RATE.
Master's thesis,
by Paul C. Pleva, Jr. May 65, 120p
Rept. no. GGC/EE/65-11

Unclassified report

Descriptors: (*Gyroscopes, Attitude control systems), (*Attitude control systems, Simulation), (*Satellite attitude, Attitude control systems), Pitch, Gyro stabilizers, Functions, Programming(Computers).

A satellite gyroscopic attitude control system using four single-degree-of-freedom control gyros is analyzed by signal flow graphs, and simulated on an IBM 7094 computer using a digital analog simulation subroutine. A signal flow graph is first developed for one gyro, and then extended to the four gyro configuration. A transfer function is derived for each axis from the signal flow graph, and coefficients are chosen to optimize performance about the X and Y axes which have equal moments of inertia. The Z axis has a moment of inertia one-fortieth of the other two, and the resulting higher natural frequency is compensated by a Z axis angular accelerometer. Digital simulation demonstrated that the system is capable of correcting step and rate errors about each axis. Orbital pitch rate is introduced causing the net gyro spin momentum vector to precess. The simulated flight computer torqued the gyros to correct for the precession. This maintained the spin momentum vector fixed in inertial space while the vehicle maintained its pitch rate. The MIDAS program and five sample data runs are included. (Author)

AD-619 314 Div. 12/6, 12/2, 19/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
USE OF SINGLE-AXIS ORIENTATION FOR ARTIFICIAL EARTH SATELLITES,
by R. F. Appazov, V. P. Legostaev, and B. V. Raushenbakh. 15 Jun 65, 23p
Rept. no. FTD-MT-65-181
TT 65-62919

Unclassified report

Edited machine trans. of Unidentified Russian article, p1-21 1965.

Descriptors: (*Satellites(Artificial), Flight control systems), (*Flight control systems, Satellites-(Artificial)), Thrust vector control systems, Horizon scanners, Solar radiation, Gyroscopes, Space flight, Descent trajectories, Atmosphere entry, Celestial guidance, USSR.

It is assumed that the axis coincides with the direction of jet thrust of the engine, intended for transition to the descent orbit. The system consists of a photo-electric sensor, three two-degree-of-freedom gyroscopes, reacting to the corresponding projections of angular velocity the vehicle and a logic unit, and actuators (small jet engines). The photo-electric pickoff ('solar sensor') reacts only to turns of the ship (with respect to the direction to the Sun).

AD-619 348 Div. 12/6, 12/1
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
DEVELOPMENT AND USAGE OF THE ROCKET TRAJECTORY PROGRAM,
by Barry W. Boehm. Aug 65, 7p
Rept. no. P-3187

Unclassified report

Presented to the Design Automation Working Group San Francisco, Calif, 8 Jun 65.

Descriptors: (*Aerospace craft, Trajectories), (*Trajectories, Programming(Computers)), Flight paths, Simulation.

Rocket simulates trajectories of aerospace vehicles, numerically integrates the set of differential equations of motion of the vehicle specified, calculates automatically such aspects as earth gravitational and rotational effects, traces the trajectory of a vehicle as a function of time, and provides information on the performance during flight. The program can print statements on special qualities and investigate a number of variations on a given trajectory in a single run. This paper discusses the purpose of the program and its capabilities. Suggestions are made on the development of general-purpose computer programs.

AD-619 395 Div. 12/6, 12/1
CFSTI Prices: HC$4.00 MF$1.00

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
PLANE-CHANGE REQUIREMENTS ASSOCIATED WITH RENDEZVOUS IN A SATELLITE ORBIT ABOUT MARS.
Master's thesis,
by Randolph Manchester Teague. Jun 65, 116p
Rept. no. GGC/EE/65-16

Unclassified report

Descriptors: (*Rendezvous trajectories, Mars probes), (*Mars probes, Rendezvous trajectories), (*Astronautics, Mars probes), Manned spacecraft, Rendezvous spacecraft, Soft landings, Mars, Orbital trajectories, Celestial mechanics.

The purpose of this thesis is to determine the plane-change requirements associated with rendezvous in a satellite orbit about Mars. The geometry of the landing

and rendezvous is first worked out along with derivations of appropriate equations. The effect of satellite orbit perturbations is investigated with planet oblateness having the only noticeable influence for short staytimes on Mars. The requirement of maintaining rendezvous capability at all times while on the planet surface was studied with the results appearing as a graph from which the minimum-maximum plane-change angle can be obtained for all staytimes, landing latitudes and orbit angles. (Author)

How To Use Indexes To TAB Portion Of

U. S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS

SUBJECT INDEX

The Subject Index is arranged alphabetically by asterisked descriptors from the document announcements in the TAB. Each announcement contains one or more asterisked descriptors which identify the main subjects of the report. The asterisked descriptor may or may not have a modifying descriptor appearing directly below the asterisked descriptor. Under each descriptor entry in the Subject Index appear the following items of information: annotation, AD number, and field number. A typical subject index entry is shown below.

*COMBUSTION
OSCILLATION
INTENTIONAL COMBUSTION
OSCILLATIONS IN PROPULSION
SYSTEMS
AD-608 206 FLD. 25

PERSONAL AUTHOR INDEX

The Personal Author Index is arranged alphabetically by the last names of the authors of reports. When several report entries are given for one author, the entries are arranged numerically by AD number. Field numbers and titles are also listed. Again, three asterisks serve as a separator between entries for reports under the same author. A typical personal author entry is shown below.

*BENDAT, JULIUS S.
* * *
ZERO CROSSINGS OF A SINE
WAVE PLUS RANDOM NOISE
AD-608 019 FLD. 15
* * *
SPECTRA AND AUTOCORRELATION
FUNCTIONS FOR FULLY DEVELOPED
SEAS AND PREDICTION OF STRUCTURAL
FATIGUE DAMAGE
AD-608 464 FLD. 2

CORPORATE AUTHOR-MONITORING AGENCY INDEX

The Corporate Author-Monitoring Agency Index is arranged alphabetically by corporate authors and monitoring agencies.

In the corporate author entry (designated by an asterisk) for each document are listed the originator of the report, the originator's report number, the title, AD number, and field number. If the source has listed a monitoring agency in the report, the monitor acronym and monitor series number are given in parantheses directly under the title. An IDEP (Interservice Data Exchange Program) report number is presented in the same way. A typical corporate author entry is shown on the next page.

*SHEFFIELD UNIV (ENGLAND)
* * *
HIC 45
INTENTIONAL COMBUSTION OSCILLATIONS IN PROPULSION SYSTEMS
(AFOSR 64 2029)
AD-608 206 FLD. 25

The three asterisks serve as a separator between entries for reports under the same corporate author.

When a report lists a monitoring agency, a corresponding entry is provided under the name of the monitoring agency, which appears in alphabetical order among the corporate author entries. In a monitoring agency entry, the report number is given above the title in place of the originator's report number. A typical monitoring agency entry is shown below.

*AIR FORCE OFFICE OF SCIENTIFIC RESEARCH WASHINGTON D C
* * *
64 2029
INTENTIONAL COMBUSTION OSCILLATIONS IN PROPULSION SYSTEMS
AD-608 206 FLD. 25

CONTRACT INDEX

The Contract index is arranged alphanumerically by contract number. Within a contract grouping, each entry contains corporate author, series number (if any), monitor number (if any), AD number, and field number.

When there are multiple document entries under one contract number, entries are arranged by AD number under each corporate author represented.

A contract entry may also contain a letter F, A, or S on the left-hand margin, indicating that the document is a Final, Annual, or Summary report. A typical contract entry is shown below.

*AF19 628 500
LINCOLN LAB MASS INST OF TECH LEXINGTON
LL TR 365
(ESD TDR64 378)
AD-608 272 FLD. 30
LL 1964 63
(ESD TDR64 566)
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(RADC TR-69-381)
F AD-618 701 FLD. 9

•AF30 602 3429
SCIENTIFIC-ATLANTA INC ATLANTA GA
(RADC TR-69-89)
AD-618 702 FLD. 9

•AF30 602 3482
GENERAL ELECTRIC CO SYRACUSE N Y ELECTRONICS LAB
F AD-618 738 FLD. 9

•AF30 602 3969
MICHIGAN UNIV ANN ARBOR ELECTRON PHYSICS LAB
(RADC TR-69-110)
AD-618 694 FLD. 9
(RADC TR-69-191)
AD-618 916 FLD. 9

•AF33 615 1079
PRINCETON UNIV N J GAS DYNAMICS LAB
AD-619 142 FLD. 20

•AF33 615 1080
RENSSELAER POLYTECHNIC INST TROY N Y
(ARL 69-106)
AD-619 278 FLD. 20

•AF33 615 1124
RADIATION EFFECTS INFORMATION CENTER COLUMBUS OHIO
AD-619 022 FLD. 18

•AF33 615 1334
PHYSICS ENGINEERING CHEMISTRY CORP BOULDER COLO
(ARL 69-91)
F AD-619 045 FLD. 20

•AF33 615 1383
ATLANTIC RESEARCH CORP ALEXANDRIA VA
(AMRL TR-69-78)
F AD-619 378 FLD. 4

•AF33 615 1418
MEASUREMENT ANALYSIS CORP LOS ANGELES CALIF
(FDL TR-69-199)
F AD-619 272 FLD. 20

•AF33 615 1470
MASSACHUSETTS INST OF TECH CAMBRIDGE AEROPHYSICS LAB
(ARL 69-119)
A AD-619 174 FLD. 14
(ARL 69-113)
AD-619 271 FLD. 14

•AF33 615 1816
NEW YORK UNIV N Y
(ARL 69-107)
AD-619 097 FLD. 1

•AF33 615 1998
RESEARCH TRIANGLE INST DURHAM N C
(ASD TDR-63-316 V7)
AD-618 704 FLD. 9

•AF33 616 3878 GRANT
CARNEGIE INST OF TECH PITTSBURGH PA
AD-618 787 FLD. 12

•AF33 616 7962
PURDUE UNIV LAFAYETTE IND
(AMRL TR-69-39)
F AD-618 895 FLD. 9

•AF33 616 8963
MASSACHUSETTS INST OF TECH CAMBRIDGE ELECTRONIC SYSTEMS LAB
(AMRL TR-69-97)
F AD-618 706 FLD. 9

•AF33 657 10399
SPACE AND INFORMATION SYSTEMS DIV NORTH AMERICAN AVIATION INC DOWNEY CALIF
SID 69 192 4
(FDL TDR-69-152 P4)
F AD-619 396 FLD. 1
SID 69 1912 5
(FDL TDR-69-152 P5)
F AD-619 397 FLD. 1

•AF33 657 11097
NEW YORK UNIV N Y DEPT OF PHYSICS
(AROD 4059-2)
AD-619 391 FLD. 20

•AF33 657 7127
EAGLE-PICHER RESEARCH LABS MIAMI OKLA
(ARL 69-100)
F AD-619 279 FLD. 20

•AF33 657 8429
FAIRCHILD HILLER CORP BAY SHORE N Y STRATOS DIV
(APL TR-69-93)
AD-619 018 FLD. 21

•AF33 657 8859 GRANT
OKLAHOMA UNIV RESEARCH INST NORMAN
(ARL 69-110)
AD-619 096 FLD. 20

•AF49 638 1009
LEHIGH UNIV BETHLEHEM PA
(AFOSR 69-1039)
AD-619 392 FLD. 12

•AF49 638 1078
ACOUSTICS AND SEISMICS LAB UNIV OF MICHIGAN ANN ARBOR
AD-618 782 FLD. 8

•AF49 638 1119
SOUTHWEST RESEARCH INST SAN ANTONIO TEX DEPT OF MECHANICAL SCIENCES
(AFOSR 69-1199)
AD-618 980 FLD. 20

•AF49 638 1139
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
(AFOSR 69-1022)
AD-618 851 FLD. 12

•AF49 638 1170
ACOUSTICS AND SEISMICS LAB UNIV OF MICHIGAN ANN ARBOR
AD-618 782 FLD. 8

•AF49 638 1284
COLUMBIA UNIV NEW YORK PLASMA LAB
AD-619 206 FLD. 19

•AF49 638 1276
STANFORD UNIV CALIF DEPT OF AERONAUTICS AND ASTRONAUTICS
(AFOSR 69-0982)
AD-619 092 FLD. 20

•AF49 638 1323
PALOMAR OBSERVATORY PASADENA CALIF
(AFOSR 69-1080)
AD-619 133 FLD. 3

•AF49 638 1327 GRANT
SEISMOLOGICAL LAB CALIF INST OF TECH PASADENA
AD-618 780 FLD. 8

•AF49 638 1341
STANFORD UNIV CALIF
(AFOSR 69-0876)
AD-619 126 FLD. 6

•AF49 638 1389
ADVANCED KINETICS INC COSTA MESA CALIF
(AFOSR 69-1140)
AD-619 134 FLD. 20

•AF49 638 1399
HARVARD UNIV CAMBRIDGE MASS
(AFOSR 69-0977)
AD-619 393 FLD. 5

•AF49 638 1553
AVCO EVERETT RESEARCH LAB EVERETT MASS
AD-619 215 FLD. 20

•AF49 638 293
POLYTECHNIC INST OF BROOKLYN N Y INST OF POLYMER RESEARCH
(AFOSR 4376)
F AD-619 350 FLD. 7

•AF49 638 659
AVCO EVERETT RESEARCH LAB EVERETT MASS
AD-619 215 FLD. 20

•AF49 638 700
RAND CORP SANTA MONICA CALIF
AD-619 033 FLD. 17
AD-619 219 FLD. 12
AD-619 246 FLD. 19

•AF49 638 708
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MATHEMATICS
(AFOSR J1350)
F AD-619 207 FLD. 20

•AF49 638 904 GRANT
CALIFORNIA UNIV BERKELEY
AD-618 781 FLD. 8

•AF49 638 947 GRANT
RIAS INC BALTIMORE MD
(AFOSR 69-1918)
AD-619 139 FLD. 6

•AF49 638 951 GRANT
MOORE SCHOOL OF ELECTRICAL ENGINEERING UNIV OF PENNSYLVANIA PHILADELPHIA
AD-618 794 FLD. 9

•AF49 638 991
GENERAL APPLIED SCIENCE LABS INC WESTBURY N Y
(AFOSR 69-1311)
AD-619 091 FLD. 21
(AFOSR 69-1310)
AD-619 390 FLD. 21

•AF49 638 992
BUREAU OF SOCIAL SCIENCE RESEARCH INC WASHINGTON D C
(AFOSR 69-1229)
AD-619 389 FLD. 5

•AF61 052 901
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PHYSICS
(AFOSR 69-1138)
F AD-619 093 FLD. 20

•AF61 052 907
DANISH METEOROLOGICAL INST CHARLOTTENLUND
(AFCRL 69-510)
AD-619 293 FLD. 8

•AF61 052 971
CENTRE NATIONAL D'ETUDES DES TELECOMMUNICATIONS (FRANCE)
(AFCRL 69-564)
AD-619 250 FLD. 20

•AF61 052 988
UPPSALA UNIV (SWEDEN)
(AFCRL 69-565)
F AD-619 388 FLD. 8

•AF61 052 994
CHALMERS UNIV OF TECHNOLOGY GOTEBORG (SWEDEN) RESEARCH LAB OF ELECTRONICS
(RADC TR-69-322)
AD-619 089 FLD. 9

•AF61 052 664
WALES UNIV CARDIFF
(AFCRL 69-476)
A AD-619 162 FLD. 20

•AF61 052 679
INNSBRUCK UNIV (AUSTRIA) INST FOR THEORETICAL PHYSICS
(AFOSR 69-1049)
F AD-619 094 FLD. 20

•AF61 052 689
LIEGE UNIV COINTE-SCLESSIN (BELGIUM) INSTITUT D'ASTROPHYSIQUE
(AFCRL 69-268)
AD-618 910 FLD. 3

•AF61 052 811
NORWEGIAN INST OF COSMIC PHYSICS UNIV OF OSLO
(AFCRL 69-513)
AD-619 037 FLD. 20

•ARO031 1246320
CLARKSON COLL OF TECH POTSDAM N Y
(AROD 2612:13)
AD-619 115 FLD. 7

•AT11 1 34
CALIFORNIA UNIV LOS ANGELES DEPT OF PHYSICS
AD-619 063 FLD. 20

•CWB10419
BARNES ENGINEERING CO STAMFORD CONN
F AD-619 039 FLD. 4

•CWB10428
NEBRASKA UNIV LINCOLN DEPT OF HORTICULTURE AND FORESTRY
AD-619 395 FLD. 4

•DA AMC28 043 6469
COLORADO STATE UNIV FORT COLLINS FLUID DYNAMICS AND DIFFUSION LAB
F AD-619 042 FLD. 20

•DA AMC44 177 63610
VIRGINIA UNIV CHARLOTTESVILLE RESEARCH LABS FOR THE ENGINEERING SCIENCES
(USAAML TR-69-34)
F AD-619 156 FLD. 1

•DA ARO D31 124 968
NORTH CAROLINA STATE UNIV RALEIGH
(AROD 4105:15)
F AD-619 391 FLD. 20

•DA ARO D31 1246177
PENNSYLVANIA UNIV PHILADELPHIA
(AROD 2056:15)
AD-619 309 FLD. 12
(AROD 2056:14)
AD-619 310 FLD. 12

•DA ARO D31 1246188
CORNELL UNIV ITHACA N Y SIBLEY SCHOOL OF MECHANICAL ENGINEERING
AD-619 308 FLD. 20

•DA ARO D31 1246192
MASSACHUSETTS INST OF TECH CAMBRIDGE ELECTRONIC SYSTEMS LAB
(AROD 3369:4)
AD-619 363 FLD. 9
F AD-619 223 FLD. 9

•DA ARO D31 1246305
SOUTHERN ILLINOIS UNIV CARBONDALE
(3127:2)
F AD-619 169 FLD. 12

•DA ARO D31 1246425
NEW YORK TESTING LABS INC N Y
(AROD 4019:5)
AD-619 368 FLD. 7

•DA ARO D31 1246439
INSTITUTE FOR ADVANCED STUDY PRINCETON N J
(AROD 3951:25)
F AD-619 307 FLD. 12

•DA ARO D31 1246499
CALIFORNIA UNIV LOS ANGELES
(AROD 1917:23)
AD-618 987 FLD. 12

•DA ARO031 1246499
MASSACHUSETTS INST OF TECH CAMBRIDGE

(AROD 2832:22)
AD-619 366 FLD. 7

•DA ARODJ1 1296816
VIRGINIA UNIV CHARLOTTESVILLE
(AROD 4685:2)
AD-619 367 FLD. 7

•DA MD49 193 62648
CALIFORNIA UNIV RIVERSIDE
AD-619 131 FLD. 6
CALIFORNIA UNIV BERKELEY
AD-619 132 FLD. 6

•DA MD49 193 626101
ARMED FORCES-NRC COMMITTEE ON BIO-ASTRONAUTICS WASHINGTON D C
AD-619 365 FLD. 6

•DA ORDJ1 129 616B
MINNESOTA UNIV MINNEAPOLIS SCHOOL OF CHEMISTRY
(2819:6)
AD-619 364 FLD. 7

•DA 36 039AMC03200E GRANT
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
AD-618 993 FLD. 6

•DA11 022ORDJ119
LABORATORY OF MOLECULAR STRUCTURE AND SPECTRA UNIV OF CHICAGO ILL
AD-618 712 FLD. 20

•DA18 108 409CML867A
INSTITUTE OF CONTEMPORARY RUSSIAN STUDIES FORDHAM UNIV NEW YORK
(TT 68-62789)
AD-618 717 FLD. 6

•DA19 129AMC116N
MIDWEST RESEARCH INST KANSAS CITY MO
F AD-619 280 FLD. 6

•DA20 018ORD24883
WYANDOTTE CHEMICALS CORP MICH
F AD-619 376 FLD. 11

•DA28 017AMC1090A
LEHIGH UNIV BETHLEHEM PA INST OF RESEARCH
AD-619 297 FLD. 7

•DA28 043AMC00009E
IIT RESEARCH INST CHICAGO ILL
F AD-619 087 FLD. 17

•DA28 043AMC00168E
SPRAGUE ELECTRIC CO NORTH ADAMS MASS
AD-619 143 FLD. 9

•DA28 043AMC00229E
RAYTHEON CO WALTHAM MASS MICROWAVE AND POWER TUBE DIV
F AD-619 161 FLD. 9

•DA28 043AMC00438E
AIRBORNE INSTRUMENTS LAB DEER PARK N Y
AD-619 089 FLD. 9

•DA28 043AMC01303E
AD-619 192 FLD. 4

•DA31 124ARO D139
COLORADO UNIV BOULDER
(ARL 69-108)
AD-619 028 FLD. 22

•DA31 124ARO D219
PRINCETON UNIV N J
(AROD 1719:66)
AD-619 398 FLD. 12
(AROD 1719:68)
AD-619 399 FLD. 8

•DA31 124ARO D238 GRANT
SOUTHERN ILLINOIS UNIV CARBONDALE
(3127:2)
F AD-619 165 FLD. 12

•DA31 124ARO D287
HUMAN SCIENCES RESEARCH INC MCLEAN VA
AD-619 279 FLD. 17

•DA31 124ARO D52
ILLINOIS UNIV URBANA
(AROD 9200:3)
AD-619 229 FLD. 7

•DA31 124AROD138
PURDUE RESEARCH FOUNDATION LAFAYETTE IND
(AROD 4932:2)
AD-619 084 FLD. 1

•DA31 124AROD190
VIRGINIA POLYTECHNIC INST BLACKSBURG
(AROD 4998:2)
AD-619 361 FLD. 13

•DA31 124AROD192
MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMISTRY
(AROD 2819:7)
AD-619 360 FLD. 7

•DA31 124AROD192 GRANT
MINNESOTA UNIV MINNEAPOLIS SCHOOL OF CHEMISTRY
(2819:6)
AD-619 364 FLD. 7

•DA36 039AMC02687
GENERAL ELECTRIC CO SCHENECTADY N Y ADVANCED TECHNOLOGY LABS
F AD-619 296 FLD. 13

•DA36 039ORD3976RD
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF ENGINEERING MECHANICS
AD-619 181 FLD. 20

•DA36 039AMC00001E
SHOCKLEY TRANSISTOR DIV CLEVITE TRANSISTOR PALO ALTO CALIF
F AD-619 080 FLD. 9

•DA36 039AMC01464E
LANSDALE DIV PHILCO CORP PA
AD-619 086 FLD. 17

•DA36 039AMC01466K
SANTA BARBARA RESEARCH CENTER GOLETA CALIF
AD-619 082 FLD. 17

•DA36 039AMC01481E
BERYLLIUM CORP READING PA
AD-619 379 FLD. 13

•DA36 039AMC01482E
SILICON TRANSISTOR CORP LONG ISLAND N Y
F AD-618 718 FLD. 9
F AD-618 726 FLD. 9

•DA36 039AMC02227E
WESTERN ELECTRIC CO INC NEW YORK
AD-619 083 FLD. 9

•DA36 039AMC02280E
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
AD-619 273 FLD. 20

•DA36 039AMC02294E
GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION
AD-618 722 FLD. 9

•DA36 039AMC02372E
MICROWAVE DEVICE AND PHYSICAL ELECTRONICS LAB UNIV OF UTAH SALT LAKE CITY
AD-618 739 FLD. 9

•DA36 039AMC03197E
RADIO CORP OF AMERICA LANCASTER PA ELECTRONIC COMPONENTS AND DEVICES
F AD-618 923 FLD. 10

•DA36 039AMC03621E
SPRAGUE ELECTRIC CO NORTH ADAMS MASS
AD-618 719 FLD. 9

•DA36 039AMC03622E
GENERAL INSTRUMENT CORP DARLINGTON S C CAPACITOR DIV
AD-619 081 FLD. 9

•DA36 039AMC03630E
CORNELL-DUBILIER ELECTRONICS DIV FEDERAL PACIFIC ELECTRIC CO NORWOOD MASS
AD-619 194 FLD. 9

•DA36 039AMC03639E
PIEZO CRYSTAL CO CARLISLE PA
AD-619 103 FLD. 9

•DA36 039AMC03637E
TEXAS INSTRUMENTS INC DALLAS
AD-618 934 FLD. 9

•DA36 039AMC03703E
ELECTRICAL ENGINEERING RESEARCH LAB UNIV OF ILLINOIS URBANA
AD-618 708 FLD. 9

•DA36 039AMC04196E
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
AD-619 299 FLD. 9

•DA36 039AMC04197E
GENERAL ELECTRIC CO AUBURN N Y SEMICONDUCTOR PRODUCTS DEPT
AD-619 298 FLD. 9

•DA36 039SC89972
VALPEY FISHER CORP HOLLISTON MASS
AD-619 102 FLD. 9

•DA36 039SC89974
BOMAC DIV VARIAN ASSOCIATES BEVERLY MASS
F AD-618 924 FLD. 9
F AD-618 929 FLD. 9

•DA36 039SC89977
INTERNATIONAL RECTIFIER CORP LOS ANGELES CALIF
AD-618 716 FLD. 9

•DA36 039SC86742E
TRW SEMICONDUCTORS INC LAWNDALE CALIF
AD-619 378 FLD. 9

•DA36 039SC89206
MELABS PALO ALTO CALIF
F AD-618 915 FLD. 9

•DA99 009AMC9307
HOLMAN (JOHN F) CO INC WASHINGTON D C
AD-618 724 FLD. 20
AD-618 725 FLD. 20
AD-618 739 FLD. 9

•DA99 177AMC1997
LOCKHEED-CALIFORNIA CO BURBANK CALIF
(USAAML TR-69-28)

F AD-619 153 FLD. 1

•DA99 177AMC21DT
LITTLE (ARTHUR D) INC CAMBRIDGE MASS
(AAML 69-36)
F AD-619 198 FLD. 15

•DA99 177AMC3DT
TRW INC CLEVELAND OHIO TRW ACCESSORIES DIV
(USAAVLABS TR-69-29)
F AD-619 294 FLD. 1

•DA99 177AMC42T
BELL HELICOPTER CO FORT WORTH TEX
(USAAVLABS TR-69-92)
F AD-619 157 FLD. 1

•DA99 188AR02
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
AD-618 737 FLD. 5

•DA99 193MD2920 GRANT
WASHINGTON UNIV SEATTLE SCHOOL OF MEDICINE
AD-619 387 FLD. 6

•DA99 186AMC69X
GENERAL ATOMIC DIV GENERAL DYNAMICS CORP SAN DIEGO CALIF
AD-619 214 FLD. 20

•DA99 193MD2199
APPLIED SCIENCE LABS INC STATE COLLEGE PA
AD-618 759 FLD. 6

•DA99 193MD2920 GRANT
WASHINGTON UNIV SEATTLE
AD-619 129 FLD. 6

•DA99 193MD2978 GRANT
CALIFORNIA UNIV LOS ANGELES
AD-618 977 FLD. 6

•DRB9380 19C
TORONTO UNIV (ONTARIO) DEPT OF MEDICAL BIOPHYSICS
AD-618 984 FLD. 6

•DRB9380 19G
TORONTO UNIV (ONTARIO) DEPT OF MEDICAL BIOPHYSICS
AD-618 984 FLD. 6

•DRB9830 20
MCGILL UNIV MONTREAL (QUEBEC) INORGANIC CHEMISTRY LAB
AD-618 837 FLD. 7

•DRB9938 01
TORONTO UNIV (ONTARIO)
AD-618 981 FLD. 11
AD-618 982 FLD. 11

•E2533
CALIFORNIA UNIV RIVERSIDE
AD-619 131 FLD. 6

•FA WA9689
LEAR SIEGLER INC GRAND RAPIDS MICH INSTRUMENT DIV
(SRDS RD-69-3)
F AD-619 299 FLD. 17

•FA WA9671
RAYTHEON CO WAYLAND MASS
(SRDS RD-69-91)
F AD-619 160 FLD. 17

•FA69WA 9127
INSTRUMENTATION LAB MASS INST OF TECH CAMBRIDGE
(SRDS RD-69-36)
AD-618 893 FLD. 17

•FA69WA1192
TRAVELERS RESEARCH CENTER INC HARTFORD CONN
(SRDS RD-69-32)
F AD-618 723 FLD. 4

•GB1108
LOBUND INST UNIV OF NOTRE DAME IND
AD-618 859 FLD. 6

•GB372
VIRGINIA POLYTECHNIC INST BLACKSBURG
AD-618 994 FLD. 6

•GP2003
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
AD-618 990 FLD. 12

•GP89
YALE UNIV NEW HAVEN CONN
AD-619 130 FLD. 12

•GRANT AF AFOSR62 296
UNIVERSITY OF WESTERN ONTARIO LONDON DEPT OF PHYSICS
(AFOSR 69-1089)
AD-619 362 FLD. 20

•GRANT DA ARO316929
NEW YORK UNIV N Y DEPT OF PHYSICS
(AROD 4089-2)
AD-619 381 FLD. 20

•G14096
MOORE SCHOOL OF ELECTRICAL ENGINEERING UNIV OF PENNSYLVANIA PHILADELPHIA
AD-618 794 FLD. 9

•G21347
BROWN UNIV PROVIDENCE R I
AD-618 996 FLD. 20

•G7290
CASE INST OF TECH CLEVELAND OHIO
AD-618 997 FLD. 7

•HD00888
LOBUND INST UNIV OF NOTRE DAME IND
AD-618 859 FLD. 6

•NIH GS127
TEXAS UNIV GALVESTON MEDICAL BRANCH
AD-618 804 FLD. 5

•NIH HH07722 01
CARNEGIE INST OF TECH PITTSBURGH PA
AD-619 386 FLD. 9

•NIH NB03228
STANFORD RESEARCH INST MENLO PARK CALIF
AD-618 989 FLD. 6

•NIH PH43 63 36
RIAS INC BALTIMORE MD
(AFOSR 69-1518)
AD-619 139 FLD. 6

•NOBSR 91178
GIANNINI CONTROLS CORP DUARTE CALIF
AD-618 913 FLD. 9

•NOBSR89983
GOODRICH (B F) AEROSPACE AND DEFENSE PRODUCTS AKRON OHIO
S AD-619 068 FLD. 17

•NOBSR89946
ELECTRON TUBE DIV LITTON INDUSTRIES SAN CARLOS CALIF
AD-619 088 FLD. 9

•NOBSR91191
GENERAL ELECTRIC CO AUBURN N Y SEMICONDUCTOR PRODUCTS DEPT
AD-619 090 FLD. 9

•NOBSR91299
GENERAL ELECTRIC CO AUBURN N Y SEMICONDUCTOR PRODUCTS DEPT
AD-619 049 FLD. 9

•NOBSR91341
MICROWAVE ELECTRONICS CORP PALO ALTO CALIF
AD-619 274 FLD. 9

•NOBSR93090
HANOVIA LAMP DIV ENGELHARD INDUSTRIES INC NEWARK N J
AD-619 287 FLD. 17

•NOBS84075
SCRIPPS INSTITUTION OF OCEANOGRAPHY UNIV OF CALIFORNIA LA JOLLA
F AD-619 213 FLD. 17

•NOBS84296
HYDRONAUTICS INC LAUREL MD
AD-619 064 FLD. 20
AD-619 065 FLD. 20

•NOBS90293
WEBB INST OF NAVAL ARCHITECTURE GLEN COVE N Y
AD-619 041 FLD. 13

•NOBS90496
GENERAL ELECTRIC CO PLEASANTON CALIF SPECIAL PURPOSE NUCLEAR SYSTEMS OPERATION
AD-619 379 FLD. 10

•NOBS92081
GENERAL PRECISION INC LITTLE FALLS N J AEROSPACE RESEARCH CENTER
AD-619 372 FLD. 11

•NONR 60031 61
YALE UNIV NEW HAVEN CONN
AD-619 130 FLD. 12

•NONR113801
ARCTIC INST OF NORTH AMERICA WASHINGTON D C
AD-618 783 FLD. 6
AD-618 785 FLD. 6

•NONR114707
COLORADO UNIV BOULDER
AD-618 789 FLD. 5

•NONR120207
WISCONSIN UNIV MADISON DEPT OF METEOROLOGY
AD-618 720 FLD. 4
AD-618 721 FLD. 4
AD-618 771 FLD. 8

•NONR122421 GRANT
MICHIGAN UNIV ANN ARBOR LOGIC OF COMPUTERS GROUP
AD-618 799 FLD. 12

•NONR122430
MICHIGAN UNIV ANN ARBOR DEPT OF AERONAUTICAL AND ASTRONAUTICAL ENGINEERING
AD-618 845 FLD. 20

•NONR199806
TEXAS UNIV GALVESTON MEDICAL BRANCH
AD-618 802 FLD. 6
AD-618 803 FLD. 5

•NONR162900 GRANT
LOBUND INST UNIV OF NOTRE DAME IND

AD-618 758 FLD. 6

•NONR167704
BRANDEIS UNIV WALTHAM MASS
AD-619 182 FLD. 20

•NONR183918
ILLINOIS UNIV URBANA
AD-618 908 FLD. 12

•NONR183936
ILLINOIS UNIV URBANA TRAINING RESEARCH LAB
AD-619 155 FLD. 5
AD-619 186 FLD. 5

•NONR184172
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF ELECTRICAL ENGINEERING
AD-619 290 FLD. 20

•NONR184193
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MECHANICAL ENGINEERING
AD-618 846 FLD. 20
MASSACHUSETTS INST OF TECH CAMBRIDGE FLUID MECHANICS LAB
AD-618 797 FLD. 20

•NONR184209
CALIFORNIA UNIV RIVERSIDE
F AD-619 217 FLD. 20

•NONR185830
PALMER PHYSICAL LAB PRINCETON UNIV N J
AD-618 703 FLD. 8

•NONR185837
PRINCETON UNIV N J GAS DYNAMICS LAB
AD-619 142 FLD. 20

•NONR186610
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS
AD-619 071 FLD. 20

•NONR186620 GRANT
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS
AD-618 911 FLD. 4

•NONR186637
HARVARD UNIV CAMBRIDGE MASS
AD-618 976 FLD. 12
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619 395	22
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OTHER RESEARCH REPORTS AND RELATED MATERIAL

REPORTS RELEASED BY AEC, NASA, DEPARTMENT OF COMMERCE, OTHER CIVILIAN AGENCIES, AND ALSO CERTAIN OLDER MILITARY REPORTS

*Descriptors marked with an asterisk are included in the subject index

01. Aeronautics

AD-426 983 Field 1A
CFSTI Price: HC$4.00

Electro-Optical Systems, Inc. Pasadena, Calif.
A TABULATION OF BASE FLOW PROPERTIES FOR CONES AND WEDGES,
by Hartley H. King. Jan 64, 140p Research notes RN-17
Contract DA04 495AMC28Z, ARPA Order 203 A1 63
N64 14100
Unclassified report

Rept. on Proj. DEFENDER.

Descriptors: (*Base flow, Aerodynamic configurations), (*Wedges, Base flow), (*Conical bodies, Base flow), Laminar flow, Angle of attack, Heat transfer, Enthalpy, Tables.

A systematic tabulation of laminar base flow properties for cones and wedges at zero angle of attack is presented. The results were obtained using the Chapman separated flow model, but including the effects of the finite initial boundary layer profiles existing at the separation point. Results are based on a perfect gas model with gamma = 1.4. The primary independent variables of the tables are the free stream Mach number, cone or wedge half-angle, and wall/free-stream enthalpy ratio. Data are presented showing the influence of base heat transfer and of blowing either from the body surface or from the base. A sufficient range of each independent variable is used so that one may determine the effects on the base flow due to changing each parameter individually. (Author)

AD-448 119 Field 1E, 13B
CFSTI Prices: HC$5.00

Naval Civil Engineering Lab., Port Hueneme, Calif.
AIRFIELD PAVEMENT EVALUATION, USMCALF CAMP PENDLETON, CALIFORNIA,
by R. J. Lowe and W. H. Chamberlin. Aug 64, 181p
Technical note no. NCEL-N-631
Proj. Y F015 15 02 125
Unclassified report

Descriptors: (*Landing fields, Structural properties), (*Runways, Structural properties), (*Pavements, Landing fields), Terminal flight facilities, Concrete, Cements, Asphalt, Loading(Mechanics), Air traffic, Rainfall, Temperature, Military engineering, Transport planes, Tables, California.

The evaluation of the U. S. Marine Corps Auxiliary Landing Field, Camp Pendleton, is presented with the allowable gross load capacities of the runway, taxiways, and parking apron for single, dual, single tandem and dual tandem wheel assembly aircraft. Information is also included on the construction history, climatic data, and current aircraft traffic. Results of field and laboratory tests on the pavement and subsurface materials are included in the tables. The results of the evaluation show that the runway, the connecting taxiway, and the parking apron are being overloaded by both the C-119 and KC-130 aircraft. (Author)

N65-21160 Field 1D, 12A
CFSTI Prices: HC$5.00 MF$1.25

Martin Co., Baltimore, Md.
A GUIDE OF THE APPLICATION OF THE LIAPUNOV DIRECT METHOD TO FLIGHT CONTROL SYSTEMS,
by Eugene J. Lefferts. Apr 65, 184p
Contract NAS2 1777 Unclassified report
NASA CR-209

Descriptors: (*Flight control systems, Stability), (*Differential equations, Flight control systems).

N65-23690 Field 1C
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
ZERO-LIFT DRAG AT MACH 1.42, 1.83, AND 2.21 OF A SERIES OF WINGS WITH VARIATIONS OF THICKNESS RATIO AND CHORD,
by Barrett L. Shrout. May 65, 19p NASA-TN-D-2811
Unclassified report

Descriptors: (*Wings, Drag), (*Lift, Drag).

N65-24524 Field 1A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
THE RELATION BETWEEN SKIN FRICTION AND HEAT TRANSFER FOR THE COMPRESSIBLE TURBULENT BOUNDARY LAYER WITH GAS INJECTION,
by C. C. Pappas and Arthur F. Okuno. Jun 65, 29p
NASA-TN-D-2857
Unclassified report

Descriptors: (*Turbulent boundary layer, Injection), (*Heat transfer, Aerodynamic heating).

N65-24560 Field 1A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
INVESTIGATION OF EFFECTS OF RAMP SPAN AND DEFLECTION ANGLE ON LAMINAR BOUNDARY-LAYER SEPARATION AT MACH 10.03,
by Lawrence E. Putnam. May 65, 34p
NASA-TN-D-2833
Unclassified report

Descriptors: (*Laminar boundary layer, Separation), (*Hypersonic flow, Airfoils).

Patent 3,190,588 Field 1C

AIRCRAFT CANOPY ACTUATOR.
Patent assigned to Army,
by Frank T. Pisano. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Aircraft canopies, Actuators), (*Actuators, Aircraft canopies), Locking fastener devices, Electric motors, High altitude, Safety devices, Airframes, Patents.

An electric motor drive is employed to lower an already raised canopy and is capable of holding the canopy in raised position. The canopy may be raised either manually or by motor through a particular type of lost motion connection, which, upon removal of the electric or manual lifting force, holds the canopy open and does not allow it to fall. When the canopy is locked and a clutch is disengaged, this connection allows expansion and contraction of the canopy, due to it being pressurized at ascension to high altitudes, without transmitting the forces of either expansion or contraction to the aircraft frame, thereby allowing lighter weight frame members to be used with safety.

Patent 3,192,335 Field 1D, 9E

TORQUE SENSING SWITCH.
Patent assigned to Navy,
by Eugene M. Todd, Theodore C. Herring, and
Francis X. Doyle. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Electromechanical converters, Torque), (*Torque, Electromechanical converters), Synchros, Attitude control systems, Aircraft, Patents.

The electromechanical overload torque sensing device is attached to a rotating member such as one operated by an electric servo motor. The motor is used in conjunction with a stabilizing system to maintain an aircraft in trim, that is, in a fixed attitude.

PB-168 018 Field 1E, 1B
CFSTI Prices: HC$1.00 MF$0.50

California Univ., Berkeley. Dept. of Mathematics.
ON CURVED RUNWAYS,
by H. L. Resnikoff. Jul 62, 15p
Grant NSF G19136
Unclassified report

Descriptors: (*Runways, Curved profiles), (*Landing impact, Reduction), Aircraft landings, Take-off, Parabolic bodies, Landing gear.

What is believed to be a new design for airport runways, which will reduce by a substantial factor the forces due to landing impact, is presented. A mathematical description is given of the motion of the airplane while in the process of landing. A single undamped spring will be taken as the model for the landing gear. This is certainly a vast oversimplification of the actual state of affairs; but for the present purpose of presentation, it wil suffice. The corresponding dynamical effects encountered upon take-off from the proposed runway are noted, and are presented for alleviating if not eliminating the psychological effects likely to be experienced by pilots using such runways.

PB-168 118 Field 1A
CFSTI Prices: HC$3.00 MF$0.75

Defense Research Lab., Univ. of Texas, Austin.
A PRELIMINARY STUDY OF CURVED BOW SHOCK FRONTS,
Technical rept.,
by P. H. Miller. Nov 61, 57p DRL-478
Contract NOrd16498, Task UTX-2
Unclassified report

Johns Hopkins Univ. rept. no. CF-2966.

Descriptors: (*Shock waves, Curved profiles), (*Curve fitting, Shock waves), (*Bodies of revolution, Shock waves), Supersonic flow, Angle of attack, Numerical analysis, Schlieren photography.

Several curve fitting techniques have been investigated in an attempt to develop an analytical expression which accurately describes the curved bow shock front produced by pointed bodies of revolution at angles of attack in a supersonic stream. The methods employed provided a curve fit with reasonable accuracy; however, from an analytical viewpoint difficulty was experienced with each of the methods in the satisfaction of one or more of the shock front boundary conditions. These difficulties were not considered serious, provided the local slope and curvature of the shock front were not required along the entire shock front. (Author)

PB-168 165 Field 1C
CFSTI Prices: HC$7.00 MF$2.50

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
INTERFERENCE BETWEEN WING AND BODY AT SUPERSONIC SPEEDS. PART VIII. PRESSURE DISTRIBUTION TESTS OF WING-BODY INTERFERENCE MODELS AT MACH NO. OF 2.0.
Data rept., phase 4, Test of Mar 50,
by Sidney Nichols. Jul 51, 397p
Rept. no. CAL/CF-1571
Contract NOrd10057
AD 94-304
Unclassified report

See also PB-168 167.

Descriptors: (*Wing-body configurations, Supersonic characteristics), Interference, Pressure, Distribution, Wind tunnels, Model tests, Aspect ratio, Wings, Delta wings, Conical bodies, Cylindrical bodies, Orifices, Graphics, Tables.

This report presents experimental data from wind tunnel tests which constitute the fourth phase of an investigation of supersonic wing-body interference effects. Tests were conducted at the Ordnance Aerophysics Laboratory, Daingerfield, Texas at a Mach number of 2.0. Models consisted of several bodies tested in various combination with variable incidence wings, low aspect ratio rectangular wings, a diamond-shaped wing, and a delta wing. The bodies were all geometrically similar, and consisted of a cone, a frustum of a cone and a cylindrical portion; one body-alone run completed the information previously gathered on a body of this shape. Twenty model configurations were tested in this block of 62 hours of testing time. Pressure distributions over the bodies and wings were obtained by means of orifices distributed over the models. Tetrabromethane and mercury column heights measured the pressures, which were registered on multiple tube manometer boards that were then photographed in order to furnish a permanent record of the readings. Tabulated and plotted data for all tests are given. No analysis or comparison with theoretical calculations is included. (Author)

PB-168 166 Field 1C
CFSTI Prices: HC$7.90 MF$2.25

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
INTERFERENCE BETWEEN WING AND BODY AT SUPERSONIC SPEEDS. PART IX. PRESSURE DISTRIBUTION TESTS OF WING-BODY INTERFERENCE MODELS AT MACH NO. OF 2.0.
Data rept., Phase 5 tests of Aug 51,
by Fulton E. Dye, Jr. Dec 51, 486p
Rept. no. CAL/CF-1684
Contract NOrd10057
AD 22 627
See also PB-168 165. Unclassified report

Descriptors: (*Wing-body configurations, Supersonic characteristics), Interference, Pressure, Distribution, Model tests, Wings, Graphics, Tables, Angle of attack, Reynolds number, Wind tunnels.

This report presents experimental data from wind tunnel tests constituting the fifth phase of an investigation of supersonic wing-body interference effects. Tests were conducted at the Ordnance Aerophysics Laboratory, Daingerfield, Texas, at a Mach No. of 2.0. Models consisted of eight different wing-body configurations and four wing alone configurations. Two of the wing-body configurations had variable incidence rectangular wings while the others carried fixed wings of various planforms. The aspect ratios of the various wings tested were: (1) rectangular - 0.5, 1.0, 2.0, 3.33; (2) diamond - 2.0; (3) delta - 3.0. The four wing alone configurations consisted of two rectangular wings (aspect ratio = 0.5 and 1.0), a diamond (aspect ratio = 2.0), and a delta (aspect ratio = 3.0) planform wing. Pressure distributions over the bodies and wings were obtained by means of orifices distributed over the models. The pressures were indicated on multiple tube manometer boards, utilizing tetrabromethane and mercury for the pressure indicating fluids, and were recorded photographically. Tabulated and plotted data for all tests are given. No analysis nor comparison with theoretical calculations is given in this report. (Author)

PB-168 167 Field 1C
CFSTI Prices: HC$5.00 MF$1.00

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
INTERFERENCE BETWEEN WING AND BODY AT SUPERSONIC SPEEDS. PART VI. PRESSURE DISTRIBUTION TESTS OF WING-BODY INTERFERENCE MODELS AT MACH NO. OF 2.0.
Data rept., phase 2, tests of Jun 49,
by Irving Berler and Sidney Nichols. May 51,
160p Rept. no. CAL/CF-1569
Contract Nord10057
AD 94 302
See also PB-168 169. Unclassified report

Descriptors: (*Wing-body configurations, Supersonic characteristics), Model tests, Interference, Pressure, Graphics, Tables, Orifices, Models(Simulations).

The report is concerned with the tests of a number of wing-body interference models which were conducted at a Mach No. of 2.0, during June, 1949. The method of obtaining experimental data is primarily one using the technique of pressure measurements by means of orifices distributed over the surface of the various models.

PB-168 168 Field 1C
CFSTI Prices: HC$6.00 MF$1.50

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
INTERFERENCE BETWEEN WING AND BODY AT SUPERSONIC SPEEDS. PART III. NUMERICAL APPLICATION OF THE LINEAR THEORY,
by Carlo Ferrari. 15 Apr 51, 263p
Rept. no. CAL/CM-463
Contract NOrd10057
ATI 154 470
Unclassified report

Descriptors: (*Wing-body configurations, Supersonic characteristics), (*Lift, Wing-body configurations), Numerical analysis, Linear systems, Theory, Interference, Aspect ratio, Wings, Perturbation theory, Iterative methods.

A numerical example is carried out in detail for the purpose of determining the interference effect of a body upon a wing and that of the wing upon a body in supersonic flow. The overall increment of lift on the body induced by the presence of the wing is found to be composed almost wholly of the effect corresponding to the longitudinal component of the interference velocity from the wing; this longitudinal component produces an amount of lift equal to that which would arise from that portion of the wing, covered by the body, which would be generated by it if the body were removed.

PB-168 169 Field 1C
CFSTI Prices: HC$6.00 MF$1.50

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
INTERFERENCE BETWEEN WING AND BODY AT SUPERSONIC SPEEDS. PART V. PHASE I. WIND TUNNEL TESTS CORRELATED WITH THE LINEAR THEORY,
by R. H. Cramer. Dec 50, 243p
Rept. no. CAL/CM-597
Contract NOrd10057
ATI 114 321
See also PB-168 168. Unclassified report

Descriptors: (*Wing-body configurations, Supersonic characteristics), Model tests, Wind tunnels, Ogives, Aspect ratio, Lift, Wings, Interference, Vortices, Pressure, Potential theory, Correlation techniques, Tables.

Pressure distribution data from wind tunnel tests confirm the essential features of Ferrari's linearized treatment of the problem of wing-body interference. The Reynolds number of the tests is 1,275,000 based on the wing chord, and 18 million based on body length; in a supersonic flow at Mach no. = 2.0 it appears that potential theory gives adequate description of all the observed phenomena, unclouded by viscous effects. The tip-generated disturbances are found to be negligible for this configuration, which consists of a rectangular wing of aspect ratio over 5.7 carried on a body composed of an ogival nose with cylindrical center section, and a slightly boattailed aft section. The carry-over of lift upon the body is confirmed, and the carry-over persists in appreciable amount far behind the wing. The great contribution to lift experienced by the wing, due to upwash from the body, is also confirmed, but in addition a drastic falling off of lift in the wing-body juncture is substantiated. The body-alone tests show that the cylindrical portions support considerable lift and that the squared terms (in the Bernoulli equation for pressure coefficient as a function of the velocity terms derived from linearized theory) must be used in order to obtain correlation with the experimentally determined pressure. Evidence of appreciable rotationality in the flow is also uncovered. (Author)

PB-168 170 Field 1C
CFSTI Prices: HC$3.00 MF$0.75

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
SOME SIMPLIFICATIONS OF FERRARI'S THEORY OF WING-BODY INTERFERENCE AT SUPERSONIC SPEEDS,

by Theodore R. Goodman. Dec 54, 81p
Rept. no. CAL/CM-687
Contract NOrd14523
AD 59 730

Unclassified report

Descriptors: (*Wing-body configurations, Supersonic characteristics), Interference, Integral equations, Lift, Potential theory, Integrals.

A recapitulation is given showing how a step-by-step method of solving an integral equation that appears in Ferrari's theory of wing-body interference at supersonic speeds can be replaced by a closed form solution for the sought strengths of the doublet distribution governing the flow. Further simplifications are then wrought in the expression for the governing potential and its derivatives, so that the velocity components may be determined anywhere in space by evaluation of rapidly convergent series, that may be evaluated simply by having recourse to standard tables. (Author)

02. Agriculture

PB-168 102 Field 2D, 4B
CFSTI Prices: HC$3.00 MF$0.75

Nebraska Univ., Lincoln. Dept. of Horticulture and Forestry.
GROWTH AND PHENOLOGICAL RESPONSES OF IRRIGATED DRY BEANS TO CHANGES IN MICROCLIMATE INDUCED BY A WIND BARRIER.
Master's thesis,
by Richard Elroy Felch. Jul 64, 91p

Unclassified report

Descriptors: (*Agriculture, Micrometeorology), (*Plants(Botany), Shelters), Vegetables, Climatology, Wind, Temperature, Evaporation, Humidity, Morphology-(Biology), Photosynthesis, Adaptation(Physiology), Seeds, Growth, Instrumentation, Statistical analysis.

A 50' x 50' snow fence barrier 7 feet high was erected during 1962 and 1963 in a field located at the Scottsbluff Experiment Station, Mitchell, Nebraska. Microclimatic differences were monitored within the outside of the wind barrier by means of a series of sensitive electronic instruments. Differences in the growth and phenological responses of irrigated dry beans were also determined. It was found that plant growth in general was increased in the sheltered plot. Plant height was increased, the plants had greater total leaf area and increased yield. Plant responses may possibly be related to increased water usage in the sheltered plot. As a result of greater stomatal opening, photosynthesis may have continued at a higher rate in the sheltered than in the exposed plot. (Author)

PB-168 103 Field 2D, 4B
CFSTI Prices: HC$2.00 MF$0.50

Nebraska Univ., Lincoln. Dept. of Horticulture and Forestry.
MICROCLIMATE, AIR MIXING AND PHYSIOLOGICAL REGULATION OF TRANSPIRATION AS INFLUENCED BY WIND SHELTER IN AN IRRIGATED BEAN FIELD,
by Norman J. Rosenberg. 1964, 50p
Paper no. 1652

Unclassified report

Descriptors: (*Agriculture, Micrometeorology), (*Plants(Botany), Shelters), Evapotranspiration, Wind, Growth, Vegetables, Air, Temperature, Soils, Moisture, Vapor pressure, Photosynthesis, Carbon dioxide, Adaptation(Physiology).

The paper reports the results of a study made to determine the nature of microclimatic changes induced by a wind barrier and the nature of dry bean response to the induced microclimate in an irrigated field in western Nebraska. The study was conducted during the growing seasons of 1962 and 1963. Shelter sharply reduced wind movement over the canopy of the plants. A new diurnal pattern of air and soil temperature and of vapor pressure was generated in the shelter. The plants responded by larger size and higher yield during both years and in greater leaf area during the first season. Evaporation in the shelter was reduced but the plants remained more turgid throughout the daylight hours and resisted stomatal closure allowing greater transpiration and consequently more rapid withdrawal of soil moisture. Data are presented which show that CO2 supply need not be limited in the shelter because of reduced wind passage over the plant and that greater potential photosynthesis in the shelter consequent upon the more open condition of the stomates can be realized. (Author)

PB-168 104 Field 2D, 4B
CFSTI Prices: HC$3.00 MF$0.75

Nebraska Univ., Lincoln. Dept. of Horticulture and Forestry.
GROWTH RESPONSES OF TWO IRRIGATED VARIETIES OF THE SNAP BEAN TO MICROCLIMATE CHANGES INDUCED BY A WIND BARRIER.
Master's thesis,
by David W. Lecher. Jun 65, 93p

Unclassified report

Descriptors: (*Agriculture, Micrometeorology), (*Plants(Botany), Shelters), Growth, Vegetables, Wind, Temperature, Climatology, Soils, Morphology(Biology), Adaptation(Physiology), Diurnal variations.

The research had two objectives: (a) a study of the variation in shelter effect upon microclimate under different weather conditions; (b) a study of the differences in varietal responses of the snap bean, Phaseolus vulgaris, to the protecting effects of the windbreak. To meet the first objective the microclimatic differences between sheltered and exposed regions were examined under varying conditions of sky cover and windiness at night and during the day. In order to determine how two snap bean varieties, Tendercrop and Bush Blue Lake, respond to shelter effect, measurements of emergence, plant height, leaf area, daytime changes in stomatal perimeter, yield, and pod development were made in sheltered and unsheltered areas.

03. Astronomy and Astrophysics

N65-23173 Field 3A
CFSTI Prices: HC$4.00 MF$0.75

Michigan Univ., Ann Arbor.
INSTRUMENTATION FOR MEASUREMENT OF COSMIC NOISE AT 0.75, 1.225 AND 2.0 Mc/s FROM A ROCKET,
by H. F. Schulte, H. W. Estry, R. L. Miller, and J. W. Kuiper. May 65, 109p
Contract NASw54
NASA CR-228

Unclassified report

Descriptors: (*Extraterrestrial radio waves, Measurement).

N65-23822 Field 3B, 20I
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
ROTATING GALACTIC ARMS AND LEADING-EDGE SHOCK WAVES IN H III,
by Robert E. Davidson. May 65, 15p NASA-TN-D-2810
Unclassified report

Descriptors: (*Galaxies, Rotation), (*Shock waves, Hydrogen), Magnetohydrodynamics.

N65-24562 Field 3C
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
COMPUTATION OF GENERAL PLANETARY PERTURBATIONS, PART II. A COMPARISON OF COMPONENTS,
by Lloyd Carpenter. Jun 65, 6p NASA-TN-D-2852
Unclassified report

Descriptors: (*Planets, Perturbation theory), (*Celestial mechanics, Planets), Series.

PB-167 888 Field 3A
CFSTI Prices: HC$3.00 MF$0.75

Lowell Observatory, Flagstaff, Ariz.
LOWELL PROPER MOTIONS IV.
Bulletin vol 6, no. 1 (Progress rept.),
by H. L. Giclas, R. Burnham, Jr., and N. G. Thomas.
Jul 63, 90p Bull-120
Grant NSF GP920
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Stars, Motion), Astronomical data, Catalogs, Binary stars, Colors.

Two observers independently blink-examine different plates of the same region of the sky, and measure all stars with motion > or = 0.27 sec./year directly on a calibrated grid screen. A measurement of photographic magnitude is made, and an estimate of the color of each star is obtained from a visual comparison of red and blue plates. An identification chart for each proper motion star is included. Possible double stars with components of contrasting colors, but with common proper motion too small to qualify for inclusion in the catalog, are listed in an appendix.

PB-168 144 Field 3A, 9F
CFSTI Prices: HC$3.00 MF$0.75

Harvard Coll. Observatory, Cambridge, Mass.
HARVARD RADIO METEOR PROJECT.
Final rept. for 13 Dec 57-30 Jun 61.
30 Jun 61, 88p
Contract CST7282; Grant NSF G14699
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Radio astronomy, Astronomical observatories), (*Astronomical observatories, Radio astronomy), (*Meteors, Radio astronomy), Radar stations, Ion beams, Radar signals, Angle of arrival, Velocity, Antennas, Radar antennas.

The Radio Meteor Project is a multistation radar system in which a pulse train is reflected from the ion column of a meteor. The strength of the echo varies with time, and the pulses form a Fresnel pattern. The velocity of the meteor can be found from the period of amplitude variations and the measured range, while the angle of approach of the meteor is given by the time delay between the stations; this permits the velocity, radiant and orbit of individual meteors to be found. The project is a 3-station system for measuring orbits and provides a measurement of height, deceleration, and distribution of ionization along the trail; high sensitivity makes possible the detection of meteors at magnitudes +12. The 3-station system was centered at the Long Branch field site of the National Bureau of Standards at Havana, Illinois. A double-trough antenna is used at the main site, and two 13-element Yagis are used at the remote site. For measurement of phase difference, variable-length delay lines were developed for measurement of phase angle. The IBM-7090 computing program includes reduction of Fresnel patterns based upon comparison of the measured pattern with a set of theoretical Fresnel patterns, allowing computation of 90% confidence limits for each pattern.

04. Atmospheric Sciences

AD-422 337 Field 4B
CFSTI Prices: HC$9.40

Chicago Univ., Ill. Weather Forecasting Research Center.
STUDIES IN WEATHER ANALYSIS AND FORECASTING.
Final rept. for 25 Feb 60-30 Sep 63,
ed. by Sverre Petterssen. Sep 63, 637p
Contract AF19 604 7230, Proj. 8641, Task 86410
AFCRL 63-718
Unclassified report

Descriptors: (*Weather forecasting, Scientific research), (*Meteorological parameters, Analysis), (*Atmospheric motion, Analysis), Air mass analysis, Heat transfer, Cyclones, Atmospheric precipitation, Numerical analysis, Thermodynamics, Sea water, Temperature, Marine meteorology, Colorado, Meterological charts, Clouds, Arctic regions, Stratosphere, Tropopause.

Heat exchange and cyclone development on the North Atlantic Ocean by Sverre Petterssen, Dorothy L. Bradbury, and Kaare Pedersen; An experiment in computation of precipitation by Kaare Pedersen; On the vertical circulation produced by release of latent heat in a static and quasi-geostrophic atmosphere by Kaare Pedersen; On the influence of released latent heat on cyclone development by Maurice B. Danard; A note on the use of sea-surface temperatures in synoptic weather analyses by Dorothy L. Bradbury; An investigation of Colorado cyclones by William L. Schallert; A modified 'Sigma' system of coordinates by Wayne E. Sangster; An investigation of the structure of cloud and weather systems associated with cyclones in the United States by staff members of the weather forecasting research center (edited by S. Petterssen; contributions by D. L. Bradbury E. P. McClain, Y. Omoto, G. V. Rao, R. Ternes, and G. F. Watson).

AD-615 161 Field 4A, 3B
CFSTI Prices: HC$5.00 MF$1.25

Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass. Space Physics Lab.
GEOPHYSICS AND SPACE DATA BULLETIN NO. 4,
ed. by Anne L. Carrigan and Norman J. Oliver.
Apr 65, 184p Unclassified report

Descriptors: (*Geophysics, Periodicals), (*Space environmental conditions, Periodicals), Magnetometers, Cosmic rays, Neutrons, Intensity, Monitors, Radar reflections, High frequency, Electromagnetic waves, Propagation, Extraterrestrial radio waves, Data.

Contents: Component magnetometer; Cosmic ray neutron intensity monitor; Oblique backscatter radar; Oblique H-F propagation; Riometer; Solar radio emission-spectral observations.

N65-22359 Field 4B, 22C
CFSTI Prices: HC$3.00 MF$0.50

Michigan Univ., Ann Arbor.
ATMOSPHERIC MEASUREMENTS OVER KWAJALEIN USING FALLING SPHERES,
by J. W. Peterson, W. H. Hansen, K. D. McWatters, and G. Bonfanti. May 65, 52p
Contracts N123 61756 31925A PMR, NASw138
NASA CR-218
Unclassified report

Descriptors: (*Atmospheric sounding, Falling bodies), (*Atmosphere entry, Spheres), Inflatable structures, Density.

N65-24522 Field 4B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
A RADIATION CLIMATOLOGY IN THE VISIBLE AND INFRARED FROM THE TIROS METEOROLOGICAL SATELLITES,
by W. R. Bandeen, M. Halev, and I. Strange. Jun 65, 30p NASA-TN-D-2534
Unclassified report

Descriptors: (*Meteorological satellites, Meteorological data), (*Climatology, Meteorological satellites).

N65-24523 Field 4B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THE INTERPRETATION OF TIROS RADIATION DATA FOR PRACTICAL USE IN SYNOPTIC WEATHER ANALYSIS,
by Lewis J. Allison and Guenter Warnecke.
Jun 65, 28p NASA-TN-D-2851
Unclassified report

Descriptors: (*Meteorological satellites, Meteorological data), (*Meteorology, Weather forecasting).

PB-167 987 Field 4B
CFSTI Prices: HC$2.00 MF$0.50

Alaska Univ., College. Geophysical Inst.
SUMMARY OF NOCTILUCENT CLOUD REPORTS FROM 1885-1964,
by Benson Fogle and Carol Echols. Jun 65, 30p
Rept. no. Cloud-3
Grant NSF GP1759
Unclassified report

Descriptors: (*Noctilucent clouds, Catalogs), Distribution, Optical scanning, Northern Hemisphere, Southern Hemisphere, Meteorology, Climatology, Reports.

The purpose of this report is to collect together all the reports from widely scattered sources in the literature into one complete listing of sightings. The complete list of the 1034 northern hemisphere and 8 southern hemisphere noctilucent clouds sightings reported from 1885-1964 is given in tabular form. Only those observations which were reported for a definite date are included in the table. A number of reports which gave only the month or year of the sighting were deleted as being too vague.

PB-167 988 Field 4B
CFSTI Prices: HC$2.00 MF$0.50

Alaska Univ., College. Geophysical Inst.
NOCTILUCENT CLOUDS, A SURVEY WITH SPECIAL REFERENCE TO RECENT OBSERVATIONS.
Scientific rept.,
by Benson Fogle, Sydney Chapman, and Carol Echols.
Mar 65, 47p UAG-R-162
Grant NSF GP1759
Unclassified report

See also PB-167 987.

Descriptors: (*Noctilucent clouds, Reports), Distribution, Optical scanning, Meteorological phenomena, Northern Hemisphere, Southern Hemisphere, Meteorology, Climatology.

The results obtained by the North American network and the southern hemisphere network are described in this report.

PB-168 081 Field 4B
CFSTI Prices: HC$3.00 MF$0.75

Satellite and Mesometeorology Research Project, Univ. of Chicago, Ill.
A STUDY OF FACTORS CONTRIBUTING TO DISSIPATION OF ENERGY IN A DEVELOPING CUMULONIMBUS.,
by Rodger A. Brown and Tetsuya Fujita. May 65, 70p Research paper SMRP-RP-42
Contract AF19 604 7259; Grant CWB WBG41
Unclassified report

Descriptors: (*Cumulonimbus clouds, Dynamics), Clouds, Energy, Diffusion, Thermodynamics, Meteorological parameters, Photographic analysis.

This study is concerned with an orographic cumulonimbus that developed near Flagstaff, Arizona on 19 July 1960. The growth of small cumuli into the cumulonimbus and the expansion of the latter's top were investigated using stereo-pair photographs. The photogrammetric analysis revealed that the growth of the cumulus congestus stage was characterized by a series of pulsations, each attaining greater heights than the previous one. The analysis of the anvil top revealed that it was rotating cyclonically as it expanded - an indication that the entire thunderstorm was rotating in the same sense, with vorticity values up to 0.01/sec or greater. At the time that the cumulonimbus was developing an anvil, aircraft temperature measurements were made at 11.3 km in the regions surrounding both this storm and one that had developed about half an hour earlier. The temperature consistently increased by about 1.5C in 70 km as the clouds were approached from the downwind side. The heating was interpreted as being due to the dry-adiabatic subsidence of air passing out through the anvils (12.6 km). Equations are developed, using the entrainment technique, for determining temperature, liquid-water content, kinetic energy, vertical and radical components of velocity, and hydrostatic and non-hydrostatic parts of the pressure.

PB-168 084 Field 4B, 22B
CFSTI Prices: HC$5.00 MF$1.00

GCA Corp., Bedford, Mass.
SYNOPTIC STUDIES OF VORTEX CLOUD PATTERNS.
Final rept.,
by Edward M. Brooks and William E. Shenk.
Mar 65, 164p
Technical rept. no. GCA-TR-65-5-G
Contract Cwb10817
Unclassified report

Descriptors: (*Cloud cover, Air mass analysis), (*Air mass analysis, Cloud cover), (*Meteorological satellites, Weather forecasting), (*Weather forecasting, Meteorological satellites), Aerial photographs, Infrared photography, Clouds, Vortices, Cyclones, Tropical regions, Meteorological parameters, North America, Europe, Asia.

Over fifty cases of TIROS-viewed cloud vortices associated with extratropical cyclones over North America, Europe, and Asia between April 1962 and November 1963 were examined to determine what meteorological information could be derived from the satellite pictures. Meteorological parameters were related to the age of the vortex, season, and geographical location as well as to the principal sounding class for the position of the station. The results indicated that the means of dewpoint depression for each principal class were significantly different from the overall mean of the sample according to the analysis of variance test. The wind results showed that the wind directions within 180 nm ahead of the major cloud band axes averaged 16 degrees clockwise from the band orientation, and behind the bands, 25 degrees clockwise. The mean vertical wind shears within major cloud bands and in the dry zone behind the bands were about 60 degrees and 20 degrees, respectively, clockwise from the band orientation. Most of the cloud bands were characterized by a speed convergence of the normal components and by a cyclonic shear and vorticity of the parallel components of the mean winds on the two sides of the bands.

PB-168 092 Field 4B, 22B
CFSTI Prices: HC$3.00 MF$0.75

Hebrew Univ., Jerusalem (Israel). Dept. of Meteorology.
STUDIES IN THE SYNOPTIC USES OF METEOROLOGICAL SATELLITE DATA.
Rept. for Mar 64-Feb 65,
by J. Neumann, A. Cohen, S. Jaffe, W. M. Levi, and J. L. Tokatly. 1965, 85p
Contract Cwb10834
Unclassified report

Prepared in cooperation with Israel Ministry of Transport and Communications, Meteorological Service.

Descriptors: (*Meteorological satellites, Weather forecasting), (*Weather forecasting, Meteorological satellites), Aerial photography, Cloud cover, Middle East, Mediterranean Sea, Meteorological parameters, Meteorological charts.

The general area of the Mediterranean and the Middle East includes extensive sea and desert areas where the density of reporting stations is extremely small. The synoptic maps prepared on the basis of conventional meteorological data are reexamined in the light of the additional information presented by both the Tiros photographs and radiation data (8 - 12 microns) where of all the orbits studied, the results of 14 such orbits are described. It is found that the Tiros data are of considerable use in supplementing existing synoptic data even where the reporting network of stations is not sparse. This is due to the fact that the satellite offers an overall and 'continuous' picture of cloud systems. Moreover, the satellite data are particularly important for areas where there are but few stations or no stations at all.

PB-168 100 Field 4B, 2D, 8M
CFSTI Prices: HC$1.00 MF$0.50

Iowa State Univ. of Science and Technology, Ames. Dept. of Agronomy.
PRELIMINARY EVALUATION OF METHODS FOR ESTIMATING EVAPOTRANSPIRATION AND SOIL MOISTURE DATA OVER THE NORTH CENTRAL REGION.
Final rept.
30 Jun 65, 18p
Contract Cwb10849
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Evapotranspiration, Measurement), (*Soils, Moisture), Evaporation, Meteorological parameters, Plants(Botany), Nebraska, North Dakota, Iowa, Ohio.

An evaluation was made of techniques for the estimation of evaporation pan data from meteorological data and for the prediction of soil moisture. Data from Iowa, Nebraska, North Dakota, and Ohio were used.

PB-168 105 Field 4B, 6F, 2D
CFSTI Prices: HC$1.00 MF$0.50

Nebraska Univ., Lincoln. Dept. of Horticulture and Forestry.
RELATIONSHIP BETWEEN WIND BARRIER INDUCED MICROCLIMATE AND PLANT GROWTH RESPONSE.
Final rept.,
by Norman J. Rosenberg. 30 Jun 65, 25p
Contract CWB10428
See also PB-163 407. Unclassified report

Descriptors: (*Climatology, Agriculture), (*Micrometeorology, Agriculture), (*Agriculture, Micrometeorology), (*Ecology, Micrometeorology), Wind, Shelters, Plants(Botany), Growth.

The studies were carried out during the summers of 1962 and 1963 at the Scottsbluff Experiment Station and in the summer of 1964 at the University of Nebraska Field Laboratory at Mead (30 miles north of Lincoln, Nebraska). Instrumental facilities were developed during this period which provided the means for detailed observation of microclimatic conditions and which serve as a base for continued field experimentation in plant response to microclimatic conditions. This part of the final report consists of a brief review and summarization of the experimental design and results achieved over the three year period of the contract. A detailed presentation of aerodynamic observations made during 1964 which have not yet been submitted for publication in a standard journal is also presented in this part of the report.

PB-168 106 Field 4B
CFSTI Prices: HC$6.00 MF$1.25

Satellite and Mesometeorology Research Project, Univ. of Chicago, Ill.
RESEARCH ON SEVERE LOCAL STORMS.
Final rept. for 1 Aug 63-31 Jul 64.
Apr 65, 209p
Grants CWB WBG20, CWB WBG41 Unclassified report

Descriptors: (*Storms, Meteorology), Wind, Dopper systems, Airborne, Measurement, Velocity, Errors, Jet streams(Meteorology), Statistical analysis, Mechanics, Tornadoes, Air mass analysis, Meteorological instruments.

Contents: Accurate calibration of doppler winds for their use in the computation of mesoscale wind fields by Tetsuya Fujita; Proposed operation of instrumented aircraft for research on moisture fronts and wake depressions by Tetsuya Fujita and Dorothy J. Bradbury; Statistical and kinematical properties of the low-level jet stream by William D. Bonner; The Illinois tornadoes of 17 and 22 April 1963 by Joseph L. Goldman.

PB-168 207 Field 4B
CFSTI Prices: HC$1.00 MF$0.50

National Severe Storms Project, Kansas City, Mo.
OBJECTIVES AND BASIC DESIGN.
Mar 61, 20p Rept. no. NSSP-1
Unclassified report

Descriptors: (*Weather forecasting, Storms), (*Storms, Weather forecasting), All-weather aviation, Air mass analysis, Convection, Thunderstorms, Tornadoes, Meteorological parameters, Measurement, Meteorological radar, Aircraft, Meteorology.

The primary objective of this project was to conduct such preliminary studies as might assist immediately in improving the accuracy of severe local storm forecasts, and to define the basic research tasks required for a better understanding of the tornado and other severe local storm phenomena. The Project instrumented and operated at first a P-51 and later a P-38 for exploratory flights in the vicinity of and through squall lines and other storms. In 1959, the Project initiated a program of collaboration with the Air Force, Federal Aviation Agency, and National Aeronautics and Space Administration in which multiple plane missions were flown under radar surveillance into a succession of thunderstorms and squall lines in the vicinity of Oklahoma City, base of aircraft operations. A historical resume of operations and findings of the Project through the 1960 season will be published as Report No. 2 in this preprint series.

PB-168 208 Field 4B
CFSTI Prices: HC$2.00 MF$0.50

National Severe Storms Project, Kansas City, Mo.
THE DEVELOPMENT OF AIRCRAFT INVESTIGATIONS OF SQUALL LINES FROM 1956-1960,
by Brent B. Goddard. Feb 62, 38p
Rept. no. NSSP-2
N62 121 87
Unclassified report

See also PB-168 207.

Descriptors: (*Weather forecasting, Storms), (*Storms, Weather forecasting), (*Aircraft, Atmospheric sounding), Tornadoes, Thunderstorms, Air mass analysis, Research planes, Flight paths, Meteorological instruments, Meteorology.

PB-168 209 Field 4B
CFSTI Prices: HC$1.00 MF$0.50

National Severe Storms Project, Kansas City, Mo.
INSTABILITY LINES AND THEIR ENVIRONMENTS AS SHOWN BY AIRCRAFT SOUNDINGS AND QUASI-HORIZONTAL TRAVERSES,
by Dansy T. Williams. Feb 62, 19p
Rept. no. NSSP-3
N62 15705
Unclassified report

Descriptors: (*Weather forecasting, Storms), (*Storms, Weather forecasting), (*Air mass analysis, Weather forecasting), Atmospheric sounding, Aircraft, Meteorological parameters, Meteorology.

It is the purpose of this paper to present some features of the instability line and its environment, as shown by selected pairs of the aircraft soundings. Space cross sections, using both sounding and quasi-horizontal traverse data, are also shown and are used as a basis for a qualitative model of the motion fields in the instability line and its environment. Sounding pairs were selected that met the follwoing requirements: (1) Observations made in sufficient depth to be worthwhile (usually 850 to 500 mb.), (2) Soundings an adequate distance apart (spacing ranged from 80 to 165 statute mi. with an average spacing of 112 mi.), (3) Time interval between sounding sufficiently short to permit synoptic analysis (time intervals ranged from 25 to 94 min. with an average interval of 54 min.), and (4) Individual observations on both sides of, but not inside the instability line. Nineteen sounding pairs were found that met these requirements.

PB-168 210 Field 4B
CFSTI Prices: HC$2.00 MF$0.50

Weather Bureau, Chicago, Ill.
ON THE MECHANICS OF THE TORNADO,
by J. R. Fulks. Feb 62, 38p Unclassified report
NSSP 4; N62 10303

Descriptors: (*Weather forecasting, Storms), (*Storms, Weather forecasting), (*Tornadoes, Fluid dynamic properties), Air mass analysis, Thermodynamics, Meteorological parameters, Atmospheric motion.

The primary condition necessary to formation of the tornado is considered to be the simultaneous development of upper divergence and cyclonic vorticity around the right-hand end of the elongated or squall-line type thunderstorm, caused by upward movement of air from low levels through an environment in which the winds veer with height. Essential to realization of actual net divergence aloft are the separation of uplifted air from the updraft of the storm, the sinking of rain-cooled air beneath the region of upper divergence, and the subsidence of thermally stable air at some level above the region of upper divergence. For convection to develop in the vortex it must extend into warm air at the ground. After the initial vortex forms, and convection is established through it from the ground upward, buoyancy causes each air parcel to be stretched vertically and contracted horizontally so as to increase the kinetic energy of the vortex, the result being an accumulation of energy in the vortex with each new ascending air parcel and eventual formation of the severe tornado. (Author)

PB-168 212 Field 4B
CFSTI Prices: HC$2.00 MF$0.50

Chicago Univ., Ill. Dept. of the Geophysical Sciences.
INDEX TO THE NSSP SURFACE NETWORK,
by Tetsuya Fujita. Apr 62, 38p
Contract Cwb9931
NSSP 6; N62 15365
Unclassified report

Descriptors: (*Weather forecasting, Storms), (*Storms, Weather forecasting), (*Weather stations, Distribution), Indexes, Catalogs.

The locations and heights are given for a special network of surface weather stations established in the South Central States for the purpose of obtaining detailed measurements required to study squall lines and other severe weather phenomena.

PB-168 213 Field 4B
CFSTI Prices: HC$1.00 MF$0.50

National Severe Storms Project, Kansas City, Mo.
THE VERTICAL STRUCTURE OF THREE DRY LINES AS REVEALED BY AIRCRAFT TRAVERSES,
by E. L. McGuire. Apr 62, 14p Rept. no. NSSP-7
N62 12189
Unclassified report

Descriptors: (*Weather forecasting, Storms), (*Storms, Weather forecasting), Air mass analysis, Atmospheric sounding, Aircraft, Meteorological parameters, Water vapor, Meteorology.

Aircraft data, in conjunction with synoptic data, are analyzed for three cases of sharp moisture discontinuity near the ground. Aircraft traverses of the 'dry line' yielded horizontal gradients of mixing ratio, of the order of several grams per kilogram per kilometer, through the discontinuity surface. The discontinuity surface was found to be nearly vertical through the lower 3000 to 4000 feet. No density contrast across the dry line was apparent. (Author)

PB-168 216 Field 4B
CFSTI Prices: HC$2.00 MF$0.50

National Severe Storms Project, Kansas City, Mo.
A REPORT OF THE KINEMATIC PROPERTIES OF CERTAIN SMALL-SCALE SYSTEMS,
by Dansy T. Williams. Oct 62, 26p
Rept. no. NSSP-11 Unclassified report
N63 10691

Descriptors: (*Weather forecasting, Storms), (*Storms, Weather forecasting), (*Air mass analysis, Weather forecasting), Atmospheric sounding, Thunderstorms, Atmospheric motion, Dynamics, Meteorology.

Small-scale computations of surface divergence, vorticity, deformation, and Petterssen's frontogenetical function were made with respect to a squall line, an isolated thunderstorm, and a depression wave line. The leading edge of the squall line was found to lie along an axis of maximum convergence, deformation, and frontogenesis. Centers of maximum convergence, deformation, and frontogenesis, were found in the vicinity of a micro-low along the leading edge of the squall line. Kinematic properties with respect to the depression wave were comparatively weak and poorly defined. They were strong and well defined with respect to the center of the isolated thunderstorm and the pseudo-cold fronts enclosing it. The kinematic properties of the systems give some indication as to the immediate short-period mechanisms responsible for the growth and decay of the systems. (Author)

PB-168 217 Field 4B, 1B, 17G
CFSTI Prices: HC$3.00 MF$0.75

United Air Lines, Chicago, Ill.
ANALYSIS OF THE SEVERE WEATHER FACTOR IN AUTOMATIC CONTROL OF AIR ROUTE TRAFFIC,
by W. Boynton Beckwith. Dec 62, 71p
Contract Cwb10110
NSSP 12; N63 12689 Unclassified report

Descriptors: (*All-weather aviation, Air traffic control systems), (*Air traffic control systems, All-weather aviation), (*Weather forecasting, Storms), (*Storms, Weather forecasting), Meteorological parameters, Collecting methods, Meteorological instruments.

Two severe squall line cases have been studied, using radar, aircraft, upper air and surface data collected by the National Severe Storms Project. The weather effects of these two cases on the control of air traffic, have been analyzed, using logs of taped conversations received in two Air Route Traffic Control Centers. Confirmation of the thunderstorm echo features from a WSR-57 radar are good when checked against photographs and flight logs of research aircraft flying various patterns around the storms. One flight involves a supersonic penetration of a strong buildup. Verification of related forecasts are made from scope data. Most of the important developments fell within the forecasted areas, but the areas designated are too large to be of operational use except for preliminary planning. The short range forecast required in the traffic control computer now envisioned can best be satisfied by sequenced radar echo data measured with a variable gain control. Other methods of acquiring the severe weather measurements for computer input have been evaluated and fall short of the capabilities provided by ground radar. Recommendations have been made which designate the lines along which research should be extended for increasing our knowledge of thunderstorm dynamics and, more specifically, for improving forecasting techniques. (Author)

PB-168 218 Field 4B
CFSTI Prices: HC$2.00 MF$0.50

General Mills, Inc., Minneapolis, Minn.
500-KC./SEC. SFERICS STUDIES IN SEVERE STORMS,
by Douglas A. Kohl and John E. Miller. Apr 63, 41p
Contract Cwb10346, Proj. ARDS A176
NSSP 13; N63 17912
Unclassified report

Abridged version of report no. 2346.

Descriptors: (*Atmospherics, Storms), (*Storms, Atmospherics), (*Weather forecasting, Storms), Meteorological phenomena, Electromagnetic waves, Medium frequency, Correlation techniques, Meteorological radar, Radar echo areas.

The count rate of 'sferics' monitored at 500 kilocycles per second has been related to severe weather events occurring within the detection area during a 48-day period. Sferics activity was always in evidence prior to and during severe weather occurrences. Few severe weather events occurred after the sferics count rate began to decrease. Radar evidence of 'hard' echoes from the vicinity of a severe weather event occurred prior to a rapid increase in sferics which immediately preceded the event. (Author)

PB-168 219 Field 4B
CFSTI Prices: HC$3.00 MF$0.75

National Severe Storms Project, Kansas City, Mo.
FIELD OPERATIONS OF THE NATIONAL SEVERE STORMS PROJECT IN SPRING 1962,
by L. D. Sanders. May 63, 75p Rept. no. NSSP-14
N63 18277 Unclassified report

Descriptors: (*Weather forecasting, Storms), (*Storms, Weather forecasting), Scientific research, Reports, Instrumentation, Operation, Meteorology.

The purpose of this report is to indicate the scope of the field operations conducted in 1962, and to indicate what data are available for research use as a result of these operations. No attempt has been made at this time to present actual data or findings based thereon. Such research results will appear later in the (National Severe Storms Project Report) (preprint) series, as publications of the participating agencies, and as formal articles in the regular scientific journals. It should be stated that the volume of data collected is such that the existing Weather Bureau staff of NSSP cannot adequately research all the data on a current basis and consequently must at present confine itself to the cases which appear to hold the most promise for advancing our knowledge of severe convective storms.

PB-168 220 Field 4B, 1B
CFSTI Prices: HC$1.00 MF$0.50

Aeronautical Systems Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
PENETRATIONS OF THUNDERSTORMS BY AN AIRCRAFT FLYING AT SUPERSONIC SPEEDS. RADAR PHOTOGRAPHS AND GUST LOADS IN THREE STORMS OF 1961 ROUGH RIDER,
by G. P. Roys and Paul W. J. Schumacher.
May 63, 22p Unclassified report
NSSP 15, N63 19173

Descriptors: (*Thunderstorms, Aviation safety), (*All-weather aviation, Thunderstorms), (*Weather forecasting, Storms), (*Aviation safety, Thunderstorms), Aircraft, Supersonic flight, Pressure pattern flight, Gust loads, Turbulence, Aeronautics, Meteorological radar, Radar echo areas.

PB-168 221 Field 4B
CFSTI Prices: HC$2.00 MF$0.50

Chicago Univ., Ill.
ANALYSIS OF SELECTED AIRCRAFT DATA FROM NSSP OPERATIONS, 1962,
by Tetsuya Fujita. May 63, 33p
Contract Cwb10201 Unclassified report
NSSP 16; N63 19732

Descriptors: (*Weather forecasting, Storms), (*Storms, Weather forecasting), Aircraft, Aerial photography, Cloud cover, Position finding, Photogrammetry, Doppler navigation, Meteorological parameters, Air mass analysis.

With use of photographs taken during the Spring 1962 operations of the National Severe Storms Project, preliminary analyses of the cloud patterns on both sides of the flight paths were made. Since the mosaic of the cloud patterns was photogrammetrically synthesized, and the photographs were taken from a platform moving with a ground speed of about 250 to 300 m.p.h., they could be far from synoptic. Nevertheless, they represent fairly well the conditions in the vicinity of the flight path. An attempt was made to compare the Doppler fixes with the ground positions determined by both visual and photogrammetric fixes. The vector differences between these fixes revealed that the Doppler fixes deviate from the true positions in a non-linear manner between VOR stations, thus creating errors in Doppler navigation which cannot by corrected by simply adjusting the aircraft positions at each passage over VOR stations. (Author)

PB-168 222 Field 4B
CFSTI Prices: HC$1.00 MF$0.50

National Severe Storms Project, Kansas City, Mo.
ANALYSIS METHODS FOR SMALL-SCALE SURFACE NETWORK DATA,
by Dansy T. Williams. Aug 63, 24p
Rept. no. NSSP-17 Unclassified report
N63 22726

Descriptors: (*Weather forecasting, Storms), (*Storms, Weather forecasting), Weather stations, Weather communications, Meteorological parameters, Data processing systems, Meteorology.

Methods of data reduction and techniques of analysis are presented with respect to small-scale surface network data. Examples have been taken from case studies, using data of the National Severe Storms Project Beta network. Procedures are described for determining malfunctions of instruments, corrections for time errors, and corrections for the malalignment of charts. A method is described by which barogram readings are reduced to a sea level representation. Methods for determining empirical corrections for other types of data are shown. The concept of change lines is described and the isochrone-amplitude analysis is presented to show the intensity, extent, and motion of change lines. The construction of synoptic analyses is shown. (Author)

PB-168 223 Field 4B
CFSTI Prices: HC$2.00 MF$0.50

National Severe Storms Project, Kansas City, Mo.
THE THUNDERSTORM WAKE OF MAY 4, 1961,
by Dansy T. Williams. Aug 63, 27p
Rept. no. NSSP-18 Unclassified report
N63 23657

Descriptors: (*Weather forecasting, Storms), (*Storms, Weather forecasting), (*Thunderstorms, Wake), Fluid mechanics, Atmospheric motion, Air mass analysis, Meteorology.

The nocturnal thunderstorms occurring over the National Severe Storms Project Beta Network during the night of May 3-4, 1961 have been studied to show the features of the thunderstorm wake. In this region, to the rear of the active thunderstorm, there is a fall in surface pressure which is called the wake depression. It is a hydrostatic pressure fall which results as warm, dry air is produced aloft by subsidence at the trailing edge of the thunderstorms. The thunderstorm wake is most pronounced in the dissipating thunderstorm system, and the warm, dry air produced may locally reach the surface, as the warm wake. The warm, dry air may have its moisture restored rapidly by horizontal advection and by the evaporation of the earlier rainfall. The production of considerable warm, dry air aloft and the rapid acquisition and vertical transport of moisture from the surface provides an air mass which continues to be thermodynamically favorable for additional thunderstorm activity. (Author)

PB-168 224 Field 4B
CFSTI Prices: HC$3.00 MF$0.75

National Severe Storms Project, Kansas City, Mo.
FIELD OPERATIONS OF THE NATIONAL SEVERE STORMS PROJECT IN SPRING 1963,
by J. T. Lee, L. D. Sanders, and D. T. Williams.
Jan 64, 73p Rept. no. NSSP-20
N64 19080
See also PB-168 219. Unclassified report

Descriptors: (*Weather forecasting, Storms), (*Storms, Weather forecasting), Scientific research, Research program administration, Reports, Instrumentation, Operation, Data processing systems, Meteorology.

PB-168 225 Field 4B
CFSTI Prices: HC$2.00 MF$0.50

National Severe Storms Project, Kansas City, Mo.
ON THE MOTION AND PREDICTABILITY OF CONVECTIVE SYSTEMS AS RELATED TO THE UPPER WINDS IN A CASE OF SMALL TURNING OF WIND WITH HEIGHT,
by James C. Fankhauser. Jan 64, 40p
Rept. no. NSSP-21
N64 32935

Unclassified report

Descriptors: (*Weather forecasting, Storms), (*Storms, Weather forecasting), (*Air mass analysis, Weather forecasting), Wind, Troposphere, Meteorological radar, Radar echo areas, Correlation techniques, Meteorology.

Radar composites of the extensive squall-line development of May 28, 1962, as well as the individual convective storms comprising the line, are compared to the mean wind in the troposphere. The case is distinctive since, contrary to the situation most common to vigorous convective outbreaks, there is only small turning of wind with height. The component contributions of translation and propagation toward echo motion are proposed to be linked to the mean and shear winds. Their influences on the motion of individual elements as well as on the aggregate line are discussed and the relationship between movements of individual storms and the squall line as a whole are summarized. Squall-line displacement and orientation are found to have a high degree of correlation with mean wind direction. On the basis of the statistical scatter in storm behavior for this special case, a technique for assessing the vulnerability, with respect to thunderstorm passage, of a point lying downstream from an existing storm echo is presented through the application of probability theory.

PB-168 226 Field 4B
CFSTI Prices: HC$3.00 MF$0.75

National Center for Atmospheric Research, Boulder, Colo.
MOVEMENT AND DEVELOPMENT PATTERNS OF CONVECTIVE STORMS, AND FORECASTING THE PROBABILITY OF STORM PASSAGE AT A GIVEN LOCATION,
by Chester W. Newton and James C. Fankhauser.
Jan 64, 57p
NSSP 22

Unclassified report

Prepared in cooperation with Weather Bureau, Washington, D. C.

Descriptors: (*Weather forecasting, Storms), (*Storms, Weather forecasting), Thunderstorms, Convection, Wind, Clouds, Radar echo areas, Meteorology, Oklahoma, Motion, Probability.

Studies of radar echoes disclose that, in typical severe convective situations over Oklahoma, the movement of individual thunderstorms are poorly correlated with the direction of the mean wind in the cloudbearing layer. When storms are classified according to their horizontal dimensions, however, some systematic features emerge in respect to their average behavior. When the wind veers strongly with height, the largest storms move as much as 60 degrees toward right of the mean wind, while the smallest ones move up to 40 degrees toward left. This behavior is consistent with theoretical expectations on interactions between storms and their ambient winds. These suggest that in a strongly veered environment new convection is favored on the right-hand flank of the cloud system (relative to the mean wind direction), the influence of propagation from this source being greatest in the case of large storms. A simple expression is derived, on the basis of water vapor supply and demand requirements, relating the direction of storm movement to the storm diameter and to characteristics of the wind field. (Author)

05. Behavioral and Social Sciences

AD-449 586 Field 5H
CFSTI Price: HC$5.00

Dunlap and Associates, Inc., Santa Monica, Calif.
MANUAL CONTROL, THEORY AND APPLICATIONS,
by Charles R. Kelley. 24 Jun 64, 151p
Contract Nonr410900

Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Control systems, Theory), (*Performance-(Human), Control), Human engineering, Display systems, Feedback, Analog systems, Electronic recording systems, Data storage systems, Sensory perception, Performance-(Human), Motor reactions, Mathematical analysis.

An attempt is made to develop and apply a theory of manual control. It holds that the process of control begins with man and is only partially extended by control mechanisms. The study was started with man and the way he exercises control when there is no mechanism to aid him. It briefly discusses tools and control devices, and goes into detail in dealing with control systems and with the manual control process. The final chapters apply the theory specifically to displays and controls for the human operator. No attempt is made to cover material already adequately presented in texts and handbooks. Throughout, the focus is on the nature and importance of the role played by man in the control process.

AD-449 587 Field 5H
CFSTI Price: HC$3.00

Dunlap and Associates, Inc., Santa Monica, Calif.
A SURVEY OF HUMAN OPERATOR MODELS FOR MANUAL CONTROL, APPENDIX,
by Meredith B. Mitchell. 1964, 52p

Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Behavior, Mathematical models), (*Control systems, Theory), Stochastic processes, Performance(Human), Probability, Integral transforms, Statistical functions, Nonlinear systems, Models-(Simulations).

A discussion is presented of various concepts of particular human characteristics, task limitations, and applicable mathematical techniques for constructing bounded human operator models. These concepts will undoubtedly be developed, expanded and revised in the future as we learn more about human behavior, as we look at more different types of tasks, and as we discover more readily interpretable and broadly applicable mathematical methods of handling nonlinear data. Meanwhile, it is the purpose of this paper to bring together the bulk of findings currently available. (Author)

N65-23688 Field 5J, 6S
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
RESULTS OF USAF-NASA-FAA FLIGHT PROGRAM TO STUDY COMMUNITY RESPONSES TO SONIC BOOMS IN THE GREATER ST. LOUIS AREA,
by Harvey H. Hubbard and Charles W. Nixon. May 65, 28p NASA-TN-D-2705

Unclassified report

Prepared in cooperation with Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

Descriptors: (*Sonic boom, Reaction(Psychology)).

PB-168 024 Field 5G
CFSTI Prices: HC$3.00 MF$0.75

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
MT AT M. I. T., 1965.
Final rept.,
by Victor H. Yngve. 15 Jun 65, 97p
Grants NSF G2044, NSF G3031

Unclassified report

To appear in the forthcoming book, 'Progress in Machine Translation', edited by A. D. Booth (North Holland, Amsterdam). Available copy will not permit fully legible reproduction.

Descriptors: (*Language, Analysis), (*Machine translation, Scientific research), Programming languages, Computers, Programming(Computers).

PB-168 069 Field 5I
CFSTI Prices: HC$2.00 MF$0.50

President's Science Advisory Committee, Washington, D. C.
EDUCATION FOR THE AGE OF SCIENCE.
24 May 59, 40p

Unclassified report

Descriptors: (*Education, United States), (*Scientific personnel, Education), Students, Instructors, Leadership, Universities, Engineering.

PB-168 086 Field 5I, 5A
CFSTI Prices: HC$2.00 MF$0.50

Federal Council for Science and Technology, Washington, D. C.
THE COMPETITION FOR QUALITY. THE EFFECT OF CURRENT SALARY LEVELS ON THE FEDERAL GOVERNMENT'S ABILITY TO RECRUIT AND RETAIN SUPERIOR SCIENTIFIC AND ENGINEERING PERSONNEL.
Jan 62, 49p

Unclassified report

Descriptors: (*Wages, Scientific personnel), (*Government employees, Scientific personnel), (*Personnel management, Scientific personnel), (*Scientific personnel, Government employees), United States Government, Federal budgets, Engineering personnel, Industries.

PB-168 087 Field 5I, 5A
CFSTI Prices: HC$1.00 MF$0.50

Federal Council for Science and Technology, Washington, D. C.
THE COMPETITION FOR QUALITY. NON-SALARY FACTORS AFFECTING THE SELECTION, RECRUITMENT, DEVELOPMENT, AND RETENTION OF SUPERIOR PERSONNEL IN THE SCIENTIFIC SERVICE OF THE FEDERAL GOVERNMENT.
Apr 62, 24p

Unclassified report

Descriptors: (*Government employees, Scientific personnel), (*Scientific personnel, Government employees), (*Personnel management, Scientific personnel), United States Government, Engineering personnel, Selection, Decision making, Public opinion.

PB-168 088 Field 5I, 5A
CFSTI Prices: HC$4.00 MF$1.00

Federal Council for Science and Technology, Washington, D. C.
CURRENT PROBLEMS IN THE MANAGEMENT OF SCIENTIFIC PERSONNEL, OCTOBER 17-18, 1963. Proceedings of first symposium.
1963, 141p
N64 21601

Unclassified report

Descriptors: (*Government employees, Scientific personnel), (*Personnel management, Scientific personnel), (*Scientific personnel, Government employees), United States Government, Engineering personnel, Federal budgets, Wages, Symposia.

PB-168 089 Field 5D, 5C
CFSTI Prices: HC$1.00 MF$0.50

President's Science Advisory Committee, Washington, D. C. Development Assistance Panel.
RESEARCH AND DEVELOPMENT IN THE NEW DEVELOPMENT ASSISTANCE PROGRAM.
24 May 61, 22p

Unclassified report

Descriptors: (*Foreign aid, Research program administration), (*Scientific research, Foreign aid), Political science, Economics, United States Government, Social sciences.

The purpose of the development assistance program is discussed and the need for a research and development unit within the program is pointed out.

PB-168 091 Field 5A
CFSTI Prices: HC$1.00 MF$0.50

Office of Science and Technology, Washington, D. C.
ACTIVITIES DURING CALENDAR YEAR 1963.
Interim rept.
Feb 65, 24p

Unclassified report

Descriptors: (*Research program administration, United States Government), Scientific research, Oceanography, Meteorology, Upper atmosphere, Physics, Transportation, Bibliographies.

PB-168 126 Field 5C, 12B
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif. Program in Operations Research.
COMPUTING OPTIMAL (s,S) INVENTORY POLICIES,
by Arthur F. Veinott, Jr. and Harvey M. Wagner.
26 Mar 64, 45p Technical rept. TR-1
Grant NSF GP1625 Unclassified report

Supported in part by Grant NSF G24064.

Descriptors: (*Inventory control, Optimization), (*Optimization, Costs), Statistical processes, Inventory analysis, Distribution(Economics), Industrial production, Probability.

A complete computational approach for finding optimal (s,S) inventory policies is developed. The method is an efficient and unified approach for all values of the model parameters, including a non-negative set-up cost, a discount factor 0 < alpha < 1, and a lead time. The method is derived from renewal theory and stationary analysis, generalized to permit the unit interval range of values for alpha. Careful attention is given to the problem associated with specifying a starting condition (when alpha < 1); a resolution is found that guarantees an (s,S) policy optimal for all starting conditions is produced by the computations. The special case of linear holding and penalty costs is treated in detail. In the final section, a model in which there is a minimum guaranteed demand in each period is studied, and a simplified method of solution is developed. (Author)

PB-168 193 Field 5G
CFSTI Prices: HC$4.00 MF$1.00

Ohio State Univ. Research Foundation, Columbus.
ENGLISH AND MANDARIN CHINESE: DEFINITE AND INDEFINITE DETERMINERS AND MODIFYING CLAUSE STRUCTURES. INTERROGATION IN ENGLISH AND MANDARIN CHINESE. ON THE NOTION OF 'EQUIVALENT SENTENCE STRUCTURE,
by Sandra S. Annear, Dale E. Elliott, and Charles J. Fillmore. Jun 65, 138p Rept. nos. 11, 1685-4
Grant NSF GN174, Proj. 1685

Unclassified report

Rept. on Proj. on Linguistic Analysis.

Descriptors: (*Language, Analysis), Theory.

The central objective of the Project on Linguistic Analysis is to uncover and formalize some of the underlying properties of natural language. While the attention is primarily focused on Mandarin Chinese and American English, the results achieved from studying these two languages will be of value toward the construction of a general theory of language. These results mostly take the form of assertions regarding the structure of the object language under study (rules in the grammar) and statements regarding the structure of the metalanguage used to make these assertions (rules in the theory of grammar).

06. Biological and Medical Sciences

N65-23813 Field 6D, 6P
CFSTI Prices: HC$5.00 MF$1.00

General Technical Services, Inc., Yeadon, Pa.
FURTHER STUDY OF THE DYNAMIC SYSTEMS RESPONSE OF SOME INTERNAL HUMAN SYSTEMS,
by A. S. Iberall and S. Z. Cardon. May 65, 175p
Contract NASw1066
NASA CR-219

Unclassified report

Descriptors: (*Bionics, Physiology), (*Biophysics, Mathematical models).

N65-25300 Field 6P
CFSTI Prices: HC$3.00 MF$0.75

Biosystems, Inc., Cambridge, Mass.
PHYSIOLOGY OF THE VISUAL CONTROL SYSTEM,
by Lawrence Stark, Carl Kupfer, and Laurence R. Young. Jun 65, 88p
Contract NAS2 1328
NASA CR-238

Unclassified report

Descriptors: (*Vision, Physiology), Control systems.

PB-167 927 Field 6R
CFSTI Prices: HC$1.00 MF$0.50

Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
STUDY OF THE INTERPRETATION OF IODINE-132 MEASUREMENTS IN THE ORGANISM AFTER INHALATION OF TELLURIUM-132 (Etude surl'Interpretation des Mesures d'Iode 132 dans l'Organisme apres Inhalation de Tellure 132),
by David Mechali, Marc Dousset, Renee Vial, and Monique Odievre-Penotet. Mar 65, 17p CEA-R-2727

Unclassified report

Text in French with attached summary in English.

Descriptors: (*Tellurium, Respiration), (*Radioactive isotopes, Respiration), (*Iodine, Labeled substances), Gamma-ray spectroscopy, Radiological contamination, Thyroid gland, Metabolism, France.

The work attempts to define the evolution with time of the tellurium-132 and iodine-132 distributions in the organism after a single inhalation of tellurium 132. The ratio of the activities of extra-thyroidal iodine-132 to thyroidal iodine 132 varies initially with time and only becomes constant after 36 hours. It is possible to deduce from the iodine 132 activity measured in the thyroid or in the whole organism the amount of tellurium 132 inhaled and the doses which result. Because of the uncertainty in the transmission kinetics across the inlet passages however, greater value should be attached to the measurements made at a moment when their results are independent of these kinetics, preferably after 36 hours. (Author)

PB-167 928 Field 6R, 6A, 2A, 18B
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
CAESIUM ABSORPTION BY BARLEY; INFLUENCE OF ITS RETENTION BY THE SOIL; COMPETITIVE ACTION OF POTASSIUM (Absorption du Cesium par l'Orge; Influence de sa Retention dans le Sol; Action Competitive du Potassium),
by Francoise Ferron-Trosseau. May 65, 66p
CEA-R-2708

Unclassified report

Text in French with attached summary in English.

Descriptors: (*Cesium, Absorption(Biological)), (*Grasses, Radioactive isotopes), (*Cereals, Radioactive isotopes), (*Soils, Cesium), (*Potassium, Absorption(Biological)), Plants(Botany), Ions, Solutions, Distribution, Culture medium, Radiological contamination, Health physics, Decontamination, France.

Results are reported of studies, in various culture media, of the variation of cesium absorption by barley with Ce concentration, and of the competition of this

absorption with the potassium cation. Consideration is also given to the distribution of cesium (esp. its radioactive isotopes), between the soil and solution, as a function of cesium concentration. A bibliography of 70 items is included.

PB-167 959 Field 6R, 6H, 18H
CFSTI Prices: HC$2.00 MF$0.50

Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
RADIO-ACTIVE CONTAMINATION OF FOODSTUFFS: DETERMINATION OF PERMISSIBLE LEVELS (Contamination Radioactive des Denrees Alimentaires: Determination des Niveaux Admissibles),
by Sully Ledermann. Apr 65, 42p
Rept. no. CEA-R-2707
EUR 2177 f
Unclassified report

Text in French, Attached summary in English.

Descriptors: (*Food, Radiological contamination), (*Radiological contamination, Dosage), Radioactive isotopes, Radiobiology, Diet, Numerical analysis, Strontium, Cesium, France.

In a latent air-soil contamination situation, the population would receive 80 per cent of its contamination through foodstuffs. Two methods are given here for estimating the maximum permissible concentrations in foodstuffs, together with the first diets likely to become critical when several of them are to be considered simultaneously. As an example, a numerical application of these methods using data actually available is given. The data used is naturally incomplete and this will always be true. This application test indicates however two fields in which an improvement is absolutely necessary. (1) The obtention of multiple observations (simultaneous dosage of at least 2 radio-nuclides in the same foodstuff, and simultaneous dosage of at least two foodstuffs for the same radio-nuclide); this assumes a combined effort by the various organisms. (2) The reaching of an agreement on the dosage methods used by the various organisms, since the results actually available are not comparable. (Author)

PB-168 101 Field 6C, 2C
CFSTI Prices: HC$2.00 MF$0.50

Missouri Univ., Columbia. Dept. of Soils.
EVAPOTRANSPIRATION FROM SOYBEANS AND OTHER PLANT CANOPIES IN MISSOURI DURING 1964.
Progress rept.,
by Wayne L. Decker. 1 Jul 65, 40p
Contract WBG37
Unclassified report

Descriptors: (*Evapotranspiration, Plants(Botany)), (*Plants(Botany), Evapotranspiration), Soils, Moisture, Agriculture, Climatology, Missouri.

PB-168 136 Field 6R
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
EVALUATION AS A FUNCTION OF AGE OF THE EFFECTIVE ENERGY ABSORBED IN ANY GRAM (EPSILON/m) OF ORGANS OTHER THAN THE GASTRO-INTESTINAL TRACT BY THE PRINCIPAL RADIO-NUCLIDES WHICH COULD EVENTUALLY CONTAMINATE THE FOOD AND THE ENVIRONMENT (Evaluation en Fonction de l'age des Individus de l'Energie Effective Delivree a l'Unite de Masse (Epsilon/m) des Organes Autres que le Tractus Gastro-Intestinal par les Principaux Radionuclides Susceptibles de Contaminer la Chaine Alimentaire et le Milieu Ambiant),
by Arlette Garnier. Jun 65, 96p
Rept. no. CEA-R-2809
Contract 003 61 10PSAF
EUR 2425f
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Radiological dosage, Aging(Physiology)), (*Aging(Physiology), Radiological dosage), Absorption, Radiation effects, Radiological contamination, Food, Anatomy, Graphics.

In order to evaluate internal radiation doses it is necessary to know the effective energy dissipated in any gram of the organ of reference, which depends, for any radio-nuclide, on the physical energy (E) absorbed in the body organ, on the relative biological effectiveness (RBE), on the relative damage factor (n) and on the mass of the organ (m). This effective energy may be evaluated as a function of the size and of the mass of the organs, from birth to adult age. This work is done for the principal radio-nuclides which could eventually contaminate the food and the environment. (Author)

PB-168 163 Field 6D, 12A
CFSTI Prices: HC$1.00 MF$0.50

LTV Astronautics Div., Ling-Temco-Vought, Inc., Dallas, Tex.
A PATTERN RECOGNITION FUNCTION OF INTEGRAL GEOMETRY,
by George Tenery. 1963, 14p
Contract Nonr383100
Unclassified report

Prepared for presentation at Bionics Symposium 1963, Aeronautical Systems Div., Wright-Patterson AFB, Dayton, Ohio, 19-21 Mar 63.

Descriptors: (*Pattern recognition, Integral transforms), Differential geometry, Functions, Probability, Bionics, Statistical functions.

A statistical image transformation function known as the P sub F(d) image transformation may be defined as a conditional probability and written as a quotient of integrals. Results of the numerical integration for a set of ten figures belonging to five classes show that it is possible to obtain recognition as to class and discrimination between slightly different images of the same class. (Author)

07. Chemistry

AD-282 339 Field 7D
CFSTI Prices: HC$1.00

Cornell Univ., Ithaca, N. Y. Lab. of Atomic and Solid State Physics.
MULTIPLE EXCITATION AND IONIZATION OF INNER ATOMIC SHELLS BY X RAYS.
Research rept. no. 9,
by Herbert W. Schnopper. 15 Dec 61, 11p
Contract AF49 638 402
AFOSR 1732 Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*X rays, Resonance absorption), (*Excitation, X rays), (*Ionization, X rays), Argon, Atomic energy levels, Electron transitions, Atomic spectroscopy.

Re-investigation of the argon K absorption edge region has revealed a new resonance absorption structure followed by a new continuum. These new features may be interpreted as arising from double-electron-excitation processes in which an M electron, as well as the K electron, takes part in the transitions. The first new resonance line lies about 23 ev above the first line in the previously-observed single-electron-excitation resonance structure. No additional resonance structure was found in the region from zero to about 50 ev. The results of this experiment are particularly interesting since the physical system dealt with is such a simple theoretical case, viz., a monoatomic, non-interacting atom. However, no significant theoretical predictions of multiple excitation or ionization of inner shells have yet been made. (Author)

N65-22361 Field 7D, 12A
CFSTI Prices: HC$2.00 MF$0.50

Measurement Analysis Corp., Los Angeles, Calif.
MEAN AND MEAN SQUARE MEASUREMENTS OF NONSTATIONARY RANDOM PROCESSES,
by George P. Thrall and Julius S. Bendat. May 65, 37p
Contract NAS5 4590
NASA CR-226
Unclassified report

Descriptors: (*Statistical mechanics, Stochastic processes), (*Stochastic processes, Statistical mechanics), Statistical processes, Probability.

Patent 3,192,016 Field 7B, 7E

XENON HEXAFLUORIDE AND METHOD OF MAKING.
Patent assigned to AEC,
by John G. Malm, Irving Sheft, Howard H. Claassen, and Cedric L. Chernick. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Xenon, Chemical compounds), (*Fluorides, Synthesis(Chemistry)), Fluorine, Chemical reactions, Fluorination, Uranium compounds, Patents.

Xenon hexafluoride is prepared by heating xenon gas and fluorine gas, in specific amounts, in a closed system to from 200 to 400 degrees C., whereby pressure builds up and the xenon reacts with the fluorine, forming xenon hexafluoride. The product is then cooled to room temperature for solidification. XeF6 may be used to convert lower uranium fluorides to UFG.

Patent 3,192,190 Field 7C, 11G, 11H, 11I, 11J

OCTAFLUOROVINYLPHENYL ETHER AND ITS POLYMERS.
Patent assigned to Navy,
by Leo A. Wall and Walter J. Pummer. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Halogenated hydrocarbons, Synthesis-(Chemistry)), (*Halocarbon plastics, Preparation), (*Fluorine compounds, Polymerization), (*Ethers, Polymerization), Reduction(Chemistry), Catalysts, Organic solvents, Vinyl plastics, Heat-resistant materials, Greases, Wakes, Plastics, Elastomers, Patents.

The fluorine-containing polymers have excellent thermal and oxidative resistance. The polymers may be greases, waxes, resins, and elastomers. The octafluorovinylphenyl esther is prepared directly by the reaction of tetrafluoroethylene with an alkali metal salt of a pentafluorophenoxide in the presence of solvents.

Patent 3,192,472 Field 7D, 9C

ALKALI VAPOR FREQUENCY STANDARD UTILIZING OPTICAL PUMPING.
Patent assigned to Commerce,
by Peter L. Bender and Earl C. Beaty. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Frequency stabilizers, Atomic clocks), (*Pumping(Electronics), Alkali metals), Frequency, Standards, Cesium, Vapors, Excitation, Patents.

An atomic type frequency stabilization system is disclosed. It provides simple but extremely stable frequency standards. The emission or absorption lines of different isotopes of the same element or of different elements are used for frequency stabilization purposes.

08. Earth Sciences and Oceanography

AD-451 129 Field 8C, 14B
CFSTI Price: HC$3.00

Naval Civil Engineering Lab., Port Hueneme, Calif.
WAVE MEASUREMENTS OFF OXNARD, CALIFORNIA. Final rept.,
by Wilber E. Hoffman. Aug 64, 52p
Technical note no. NCEL-N-530
Task no. YS60 00 16A
Unclassified report

Descriptors: (*Ocean waves, Measurement), California, Breakwaters, Harbors, Beaches, Sedimentation, Land, Instrumentation.

The intent is to furnish a description of a mainly water level (wave) measuring complex in about 18 feet of water behind and in the vicinity of an off-shore breakwater for a small craft harbor. The breakwater serves as a trap for sand which is by-passed periodically around the jetties of a major harbor about one mile downshore (Port Hueneme, California). Instruments and methods are discussed for the complex as progressively improved over a 10 year period beginning in 1953. Types of measurements made are presented with typical daily average declared to be: Surface water level variation from three stations: Height 1.5 feet and period 11.3 seconds; water temperature 60F; breaking wave height 2.9 feet and 6.5 period; littoral current velocity: SE set at 60 feet/minute: Wind velocity on-shore at 15 knots. The beach and sea surface were recorded on photographs periodically. All data collected was sent to Coastal Engineering Research Center for analysis and reporting. The data is intended to improve the

understanding of behavior of waves and beaches behind and in the vicinity of an off-shore breakwater. Effective July 1964, the Los Angeles District of the Corps of Engineers assumed responsibility for the complex. The information in the report is considered useful mainly to those planning subject type installation. (Author)

AD-451 506 Field 8M, 13M
CFSTI Price: HC$3.00

Naval Civil Engineering Lab., Port Hueneme, Calif.
ARCHING IN SOIL DUE TO THE DEFLECTION OF A RIGID HORIZONTAL STRIP.
Final rept.,
by C. V. Chelapati. Oct 64, 72p
Technical note no. NCEL N-591
Proj. Y F008 08 02 108a
DASA 13 018

Unclassified report

Descriptors: (*Underground structures, Soil mechanics), (*Soil mechanics, Deflection), Load distribution, Soils, Loading(Mechanics), Stresses, Tensile properties, Foundations(Structures), Wave transmission, Pressure, Series.

A study is made of the amount of arching developed in an ideal soil of finite depth due to the deflection of a rigid horizontal strip or base when the soil is subjected to high static pressures. Solutions are obtained using the equations of plane strain in the form of an infinite series. A condition is imposed that the net pressure on the base cannot be tensile. It is shown that arching in this case is a function of the parameters b/h, ph/dE, and mu; where 2b is the width of the base, h is the depth of soil, p is the pressure on the base with no deflection, d is the amount of displacement, E is the modulus of elasticity, and mu is Poisson's ratio of the soil. The first six terms in the series are evaluated using a digital computer for a wide range of parameters. The accuracy of the final solution is shown to be quite adequate. Graphs are presented showing the pressure distribution on the base and the amount of arching over the base, and an example is given to demonstrate the use of these plots. (Author)

N65-19869 Field 8L, 20N
CFSTI Prices: HC$1.00 MF$0.50

Stanford Research Inst., Menlo Park, Calif.
MEASUREMENT OF FORWARD-SCATTER CROSS SECTIONS IN THE MELTING LAYER,
by F. G. Fernald and A. S. Dennis. 1964, 4p
Contract NASr49 02
NASA CR-57468

Unclassified report

Descriptors: (*Snow, Melting), (*Radio waves, Scattering).

N65-20408 Field 8G
CFSTI Prices: HC$4.00 MF$1.00

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
A SURVEY OF DATA ON MICROSCOPIC EXTRA-TERRESTRIAL PARTICLES,
by Richard A. Schmidt. Mar 65, 132p
NASA-TN-D-2719

Unclassified report

Descriptors: (*Meteorites, Dust), (*Particle size, Meteorites).

N65-22200 Field 8N, 4A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
ON THE STABILITY OF THE BOUNDARY OF THE GEOMAGNETIC FIELD,
by John R. Spreiter and Audrey L. Summers. May 65, 30p NASA-TR-R-206

Unclassified report

Descriptors: (*Terrestrial magnetism, Upper atmosphere), (*Upper atmosphere, Magnetic fields).

PB-167 802 Field 8F, 8B, 8E, 8L
CFSTI Prices: HC$4.00 MF$0.75

Antarctic Research Program. National Science Foundation, Washington, D. C.
ANTARCTIC REPORT.
Nov 64, 105p

Unclassified report

Descriptors: (*Polar regions, Reports), Mapping, Geodesics, Photography, Biology, Geology, Glaciers, Meteorology, Seismological stations, Maps, Upper atmosphere, Physics, Scientific personnel.

Contents: Antarctic cartographic materials; Acquisitions List No. 4; Gazetteers; Geodetic data; Maps; Photography; Photography and control indexes; Field report no. 71 for November 1964; General; Biology; Cartography; Geology; Glaciology; Meteorology; Station seismology; Traverse operations; Upper atmosphere physics; U.S. scientists at foreign stations; Foreign scientists at U. S. stations; Summary of meteorological observations.

PB-168 085 Field 8H
CFSTI Prices: HC$2.00 MF$0.50

Federal Council for Science and Technology, Washington, D. C.
SCIENTIFIC HYDROLOGY.
Jun 62, 41p

Unclassified report

Descriptors: (*Hydrology, Scientific research), Water supplies, Earth, Education, Transport properties, Lakes, River, Oceans, Atmospheric precipitation.

09. Electronics and Electrical Engineering

AD-286 158 Field 9B, 17B
CFSTI Prices: HC$6.00

Melpar, Inc., Falls Church, Va.
DESIGN AND DEVELOPMENT OF A DIGITAL VOICE DATA PROCESSING SYSTEM.
Final rept.,
by L. P. Schoene, H. A. Straight, and O. C. King.
Mar 62, 202p
Contract AF19 604 5579, Proj. 4610, Task 461002
AFCRL 62-314

Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Data processing systems, Voice communication systems), (*Speech representation, Data processing systems), Special purpose computers, Speech compression, Digital systems, Programming-(Computers), Computer logic, Memory devices.

The system is a special-purpose transistorized data processor designed to support research on digital voice communication, and evaluation of a speech bandwidth compression technique. The system processes serial digital data from a speech analyzer (Vocoder) and multiplex, and operates in real-time to sort and compile the frequency distributions of voice-spectrum patterns. Provisions are included for using the analysis to obtain printouts and data tapes of voice spectrograms. A third capability involves real-time processing of digital voice signals by encoding in terms of any fixed set of voice patterns that are programmed on to the memory drum, permitting studies of the intelligibility and quality of compressed speech to be evaluated in terms of the size and structure of voice-pattern vocabulary, and the logic governing selections. Speech synthesis is performed by reading out serial data to a demultiplex and Vocoder synthesizer. A keyboard is provided for manual entry of data items, for interrogation of the memory, and for use in the manipulation of data to facilitate research studies of the perception of speech. Peripheral equipment includes a highspeed line printer, a high-speed tape perforator, and a tape reader. (Author)

AD-298 763 Field 9C, 9A, 20N
CFSTI Price: HC$10.80

Armour Research Foundation, Chicago, Ill.
TRI-SERVICE CONFERENCE ON ELECTROMAGNETIC COMPATIBILITY (8th), HELD AT THE MUSEUM OF SCIENCE AND INDUSTRY, CHICAGO, ILLINOIS OCTOBER 30, 31, AND NOVEMBER 1, 1962.
1 Nov 62, 779p
Contract DA36 039sc89102
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Radiofrequency interference, Symposia), (*Electronic equipment, Radiofrequency interference), Compatibility, Radar interference, Frequency, Mathematical prediction, Simulation, Test equipment(Electronics), Radar equipment, Radio equipment, Antennas, Antenna radiation patterns, Propagation, Radio frequency filters, Electromagnetic shielding, Filters(Electromagnetic wave).

AD-436 598 Field 9A, 9B, 12A
CFSTI Price: HC$4.00

Stanford Electronics Labs., Stanford Univ., Calif.
ORTHOGONAL EXPANSION APPLIED TO THE DESIGN OF THRESHOLD-ELEMENT NETWORKS,
by J. A. Cooper. Dec 63, 107p Technical rept. no. TR-6204-1, SEL-63-123
Contract Nonr22524, Proj. NR373 360
Unclassified report

Descriptors: (*Switching circuits, Design), (*Computer logic, Switching circuits), (*Series, Switching circuits), Transformations(Mathematics), Functional analysis, Gates(Circuits).

In an effort to gain insight into the problem of designing threshold-element networks and providing mathematical background for design procedures, a study of functions of linearly transformed (modulo-2) input variables is presented. Circuitry for realizing linearly decomposed functions consists of two parts: linear and nonlinear. The linear circuitry design is straightforward. Orthogonal expansion demonstrates that the nonlinear circuitry can always be realized by a single threshold element. Functions of n variables which are linearly separable by n transformed variables are easily realized with a single threshold element by 'compacting' function minterms in terms of Hamming distance. Functions that require more than n transformed variables for separability are more easily handled by a combination of compacting and implication. This method is efficient, but does not always lead to a single-element nonlinear circuit. A procedure is developed for assigning values to unspecified minterms based on the ease with which the completely specified function can be compacted.

AD-437 925 Field 9A
CFSTI Prices: HC$1.00

Collins Radio Co., Newport Beach, Calif.
FILTER CRYSTAL DEVELOPMENT PROGRAM (70 TO 150 MC).
Quarterly progress rept. no. 2, 15 Oct 63-15 Jan 64, by R. A. Auriemma and W. D. Peterson. 25 Mar 64, 13p Rept. no. 523-1000583-00152M
Contract DA36 039AMC03207E, Proj. 1G6 22 001
N64 28151
Unclassified report

Descriptors: (*Crystal filters, Quartz resonators), (*Quartz resonators, Crystal filters), Very high frequency, Vapor plating, Aluminum, Polishes, Crystals, Machines, Material removal, Electric filters.

A study was initiated on various configurations of filament vapor sources, specimen orientation relative to these sources, and the combined effects on the uniformity of vacuum deposition of aluminum. A special lapping/polishing machine for crystal blanks was designed and built. The specific advantages of this machine are discussed. (Author)

AD-460 592 Field 9F
CFSTI Price: HC$4.00

Washington Univ., Seattle. Dept. of Electrical Engineering.
A CLASS OF EQUIANGULAR SPIRAL ANTENNAS EXCITED BY A VERTICAL DIPOLE,
by Gary D. Bernard and Akira Ishimaru. Dec 64, 127p Technical rept. no. TR-92
Contract AF19 628 2763, Proj. 5635, Task 563502
AFCRL 65-62
Unclassified report

Descriptors: (*Spiral antennas, Dipole antennas), Omnidirectional antennas, Antenna feeds, Antenna radiation patterns, Azimuth, Polarization, Gain, Theory, Integral transforms, Voltage, Electric currents, Distribution, Experimental data, Waveguides, Radiofrequency power.

An antenna based on the plane equiangular spiral was the first of the class of so-called 'frequency independent' antennas, consisting of two plane spiral arms fed at the origin by a voltage difference. This report discusses such a spiral plane containing many spiral tapes, or arms, but excited by a vertical dipole rather than a voltage difference at the origin. Under dipole excitation the character of the radiation changes completely. Radiation is omnidirectional as a function of the azimuthal coordinate and is a narrow beam along the surface as a function of the polar spherical coordinate, and is linearly polarized. Unidirectional endfire radiation is also easily realized with dipole excitation.

Eight distinct theoretical problems are investigated, each involving the spiral plane excited by a vertical dipole, but in different surrounding geometry. All of the problems are formulated in terms of Fourier-Bessel transforms of electric and magnetic Hertz potentials, yielding exact solutions in integral form. Quantities of interest such as far zone fields, current distributions in the spiral plane, and modal solution excitation are found using the integral forms of the potentials, and are discussed. A very broadband, endfire, unidirectional, linearly polarized, high gain antenna was also developed. (Author)

AD-464 316 Field 9E
CFSTI Price: HC$1.00

Centre de Physique Electronique et Corpusculaire, Orsay (France).
HALF MILLIMETER 'BACKWARD WAVE OSCILLATOR'.
Technical progress rept. no. 1, 1 Jan-31 Mar 65.
Apr 65, 23p Rept. no. WR-1362
Contract AF61 052 814 Unclassified report
RADC TR-65-216

Descriptors: (*Backward-wave oscillators, Millimeter waves), (*Millimeter waves, Backward-wave oscillators), Design, Electron guns, Magnetic fields, Bandwidth, Power, Voltage, Effectiveness.

An O - type Carcinotron with a center frequency of 600 KM c/s is investigated and constructed. The tubes shall perform in accordance with the following electrical requirements: Center Frequency - 600 KMc/s, Bandwidth - 5 to 10 %, Power output - 500 milliwatts (C.W.), High voltage - 10 KV, Efficiency - 0.5 %, Focusing - Electro-magnet, Life time - 100 hours.

N65-19855 Field 9C, 20C, 11G
CFSTI Prices: HC$5.00 MF$1.00

National Academy of Sciences-National Research Council, Washington, D. C. Div. of Engineering and Industrial Research.
CONFERENCE ON ELECTRICAL INSULATION.
Annual rept. for 1964.
1965, 154p Unclassified report
NASA CR-57357
Also available from National Academy of Sciences-National Research Council, Washington, D. C., $5.00.

Descriptors: (*Electric insulation, Symposia), Electrical conductance, Dielectric properties.

N65-23143 Field 9C
CFSTI Prices: HC$4.00 MF$1.00

Sperry Farragut Co., Bristol, Tenn.
DESIGN DEVELOPMENT, AND FABRICATION OF A SEALED, BRUSHLESS DC MOTOR.
Final rept.
May 65, 118p
Contract NAS5 3582
NASA CR-231 Unclassified report

Descriptors: (*Electric motors, Design), Direct current.

N65-23174 Field 9F
CFSTI Prices: HC$4.00 MF$0.75

Stanford Research Inst., Menlo Park, Calif.
PCM TELEMETRY: A NEW APPROACH USING ALL-MAGNETIC TECHNIQUES,
by C. H. Heckler, Jr. and J. A. Baer. May 65, 96p
Contract NAS1 3380
NASA CR-229
Unclassified report

Descriptors: (*Telemeter systems, Pulse communication systems), (*Pulse communication systems, Telemeter systems), Transistors, Magnetic cores, Digital systems, Pulse modulation.

Patent 3,191,063 Field 9A, 20L

CRYOELECTRIC CIRCUITS.
Patent assigned to Air Force,
by Richard W. Ahrons. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Circuits, Cryogenics), (*Superconductors, Circuits), Ferromagnetic materials, Switching circuits, Inductance, Patents.

The high speed inductive switch is suitable for use in a cryoelectric selection tree. An element, formed of a ferromagnetic material, having a u which is greater than one is placed on the side of a control ground plane opposite from a drive current carrying lead. The three elements may be in the form of thin films. The circuits are maintained at a temperature at which superconductivity is possible.

Patent 3,191,067 Field 9B, 9A

LOGICAL GATING AND ROUTING CIRCUIT.
Patent assigned to Air Force,
by Herbert Zimmerman. 22 Jun 65, Unclassified patent
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Computer logic, Gates(Circuits)), (*Gates(Circuits), Computer logic), Digital computers, Circuits, Limiters, Trigger circuits, Relaxation oscillators, Patents.

The circuit is used in a digital computer to perform functions of limiting, triggering, gating, and signal routing. A gating circuit is used to trigger a monostable multivibrator, the unstable state of which is used to inhibit all gates of a number of gated amplifiers for a delay time determined by the duration of the unstable state of the multivibrator; any noise on the gating signal is therefore prevented from causing erroneous circuit operation.

Patent 3,191,120 Field 9C

BRIDGE-TYPE CATHODE INTERFACE IMPEDANCE TEST SET.
Patent assigned to Army,
by Jun Tamiya. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Impedance bridges, Test sets), (*Test sets, Impedance bridges), Electrical impedance, Impedance matching, Cathodes-(Electron tubes), Measuring devices(Electrical + Electronic), Patents.

The circuit is for measuring the impedance of the cathodes in electron tubes. A bridge circuit is used to compare the impedance of a standard tube with that of the tube to be tested, when both are fed with a plurality of sinusoidal signals. The use of sinusoidal signals permits the use of narrow band filters in the null detection circuit which greatly reduces noise and increases accuracy.

Patent 3,191,130 Field 9E

PHASE SHIFTER USING TWO VOLTAGE SENSITIVE ELEMENTS.
Patent assigned to Navy,
by Harry C. Rudd, Jr. and Walter J. Mozdzen.
22 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Phase shifters, Automatic), Voltage, Electrical impedance, Circuits, Patents.

The phase shifter has the capability of shifting a constant amplitude waveform through a range of phase angles automatically. By using voltage sensitive impedance elements in combination with an active element, a voltage sensitive automatic variable phase shifter is provided for shifting a waveform in accordance with a D.C. signal applied thereto.

Patent 3,192,372 Field 9D

SIGNAL-LEVEL COMPARING SYSTEM.
Patent assigned to Commerce,
by Charles M. Allred. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Signal generators, Analysis), Signals, Patents.

The system compares the level of a signal developed by a standard source with the level of a signal developed by a signal source. The outputs of a pair of signal sources are combined in such a manner as to obtain a first and second signal. The first signal has a magnitude equal to the sum and the second a magnitude equal to the difference of the levels of the outputs of the signal sources. The first and second signals are then multiplied together to obtain a product signal. The latter is averaged, so that its noncorrelated components are substantially zero, and is then applied to an arrangement for indicating the level of the output of one source relative to that of the other.

Patent 3,192,530 Field 9E, 9A

ELECTRONICALLY SCANNED ARRAY WITH DIODE CONTROLLED DELAY NETWORK.
Patent assigned to Navy,
by Bernard I. Small. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Phased array, Electronic scanners), (*Delay circuits, Phased arrays), Switching circuits, Phase control devices, Patents.

The scanning antenna system incorporates diode controlled radio frequency switches for switching in various physical path lengths over which the radio frequency energy is coupled to the radiating elements to shift the direction of the phase front of the array.

PB-167 952 Field 9B
CFSTI Prices: HC$1.00 MF$0.50

Electronic Systems Lab., Mass. Inst. of Tech., Cambridge.
SKETCHPAD III. A COMPUTER PROGRAM FOR DRAWING IN THREE DIMENSIONS,
by Timothy E. Johnson. 1963, 7p
Contract AF33 600 42859
Unclassified report

Pub. in Spring Joint Computer Conference. Proceedings, 1963.

Descriptors: (*Programming(Computers), Graphics), Pattern recognition, Display systems, Input-output devices, Communication systems.

PB-167 999 Field 9B, 17G
CFSTI Prices: HC$3.00 MF$0.75

Autonetics, Downey, Calif.
RECOMP I. SHORAN RECONNAISSANCE COMPUTER.
Final rept.
20 Sep 56, 69p
Rept. no. EM-1360
Contract AF33 600 29353
RADC TR-58-11 AD 148 563 Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Digital computers, Radar navigation), (*Navigation computers, Computer logic), (*Computer logic, Navigation computers), Portable, Transistors, Circuits, Control sequences, Input-output devices.

The design of a 5.7-cu-ft, 216-lb, portable, general-purpose, digital computer is described. Designated RECOMP I, the transistorized computer was built for the Rome Air Development Center. Detailed descriptions are included of computer operation, computer components, and test equipment.

PB-168 095 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Raytheon Co., Hawthorne, Calif. Electronic Services Operation.
RADIO TEST SET, TS-907/ULR.
Instrument calibration procedure technical manual.
15 Mar 65, 13p
Contract N123 62861 35058A
NAVWEPS 17-20AX-02
Unclassified report

Descriptors: (*Test equipment(Electronics), Calibration), (*Test sets, Radio equipment), (*Radio equipment, Alignment), Instruction manuals, Test methods, Electronic countermeasures, Electronic equipment.

The technical manual contains the procedures for calibrating Radio Test Set TS-907/ULR. It is divided into six functional sections to provide segregated information as follows: introduction and description; equipment required; preliminary operations; calibration procedure; test instrument evaluation; calibration checklist and work sheets.

PB-168 096 Field 9E
CFSTI Prices: HC$1.00 MF$0.50

North American Aviation, Inc., Anaheim, Calif.
KLYSTRON POWER SUPPLY, MODEL 62A1 (SPERRY).
Instrument calibration procedure technical manual.
15 Mar 65, 16p
Contract N123 62861 50267A
NAVWEPS 17-20GH-01
Unclassified report

Descriptors: (*Power supplies, Calibration), (*Klystron, Power supplies), Instruction manuals, Test methods, Electrical properties, Test equipment-(Electronics), Voltmeters, Oscilloscopes.

The manual describes the calibration procedure for the Sperry 62A1 klystron power supply.

PB-168 125 Field 9B, 6D
CFSTI Prices: HC$4.00 MF$0.75

Michigan Univ., Ann Arbor. Communication Sciences Program.
PAPERS IN AUTOMATA THEORY: III.
Final rept.,
by A. W. Burks, Y. Give'on, J. H. Holland, and J. W. Thatcher. Dec 63, 108p Rept. no. ORA-04995-1-F
Grant NSF G22258, Proj. ORA04995
Unclassified report

Descriptors: (*Automata, Theory), (*Cybernetics, Automata), Matrix algebra, Sequences, Communication theory, Data processing systems, Programming(Computers), Mathematical logic, Computer logic, Artifical intelligence.

Contents:
Cellular automata, by A. W. Burks,
The application of algebraic systems to finite automata, by Y Give'on,
A criterion for structural balance based on the algebra of signed adjacency matrices, by Y. Give'on,
Information processing in adaptive systems, by J. H. Holland,
Notes on mathematical automata theory, by J. W. Thatcher.

PB-168 150 Field 9E
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
FREQUENCY CONVERTER HEWLETT-PACKARD 525C.
Technical manual instrument calibration procedure, AF09.
15 Mar 65, 10p NAVWEPS-17-20AF-09
Unclassified report

Descriptors: (*Frequency converters, Calibration), Instruction manuals, Test methods.

The manual describes the calibration procedure for the Hewlett-Packard 525C frequency converter.

PB-168 151 Field 9E
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
MICROWAVE OSCILLATOR MODEL 1360-A (GENERAL RADIO).
Technical manual instrument calibration procedure, GG-11.
1 May 65, 16p NAVWEPS-17-20GG-11
Unclassified report

Descriptors: (*Microwave oscillators, Calibration), Instruction manuals, Test methods.

The General Radio 1360-A microwave oscillator is a general-purpose oscillator with a relatively high power output at frequencies of 1.7 to 4.1 Gc. The manual describes the calibration procedure for the oscillator.

PB-168 152 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Boeing Co., Seattle, Wash. Aero-Space Div.
CLAMP-ON MULTIMETER ME-79, P/O AN/USM-33 ME-79A, P/O AN/USM-33A.
Technical manual instrument calibration procedure, AQ-32.
1 Mar 65, 11p
Contract N123 62861 35056A Unclassified report
NAVWEPS 17-20AQ-32

Descriptors: (*Test equipment(Electronics), Calibration), (*Multimeters, Calibration), Voltmeters, Ammeters, Alternating current, Instruction manuals, Test methods.

The manual describes the calibration procedure for the AN/USM-33 CLAMP-ON MULTIMETER, which consists of the ME-79/USM-33 or the ME-79A/USM-33. The Test Instrument is a combination alternating voltmeter and alternating current meter providing measurement capabilities to 600 volts and 600 amperes.

PB-168 153 Field 9E
CFSTI Prices: HC$1.00 MF$0.50

Boeing Co., Seattle, Wash. Aero-Space Div.
WIDE-BAND CHAIN AMPLIFIER 202D (SPENCER-KENNEDY LABORATORIES).
Technical manual instrument calibration procedure, AA-24.
1 Apr 65, 11p
Contract N123 62861 35056A
NAVWEPS 17-20AA-24
Unclassified report

Descriptors: (*Amplifiers, Calibration), Broadband, Gain, Instruction manuals, Test methods.

The manual describes the calibration procedure for the Spencer-Kennedy Laboratories 202D Wide-Band Chain Amplifier. The Test Instrument is a wide band amplifier with a gain of approximately 20 db, and a bandwidth of 1 kc to 210 Mc.

PB-168 154 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

SSCO Standards Lab., Inc., Southfield, Mich.
VOLTAGE BREAKDOWN TESTER MODEL P-2 (INDUSTRIAL INSTRUMENTS).
Technical manual instrument calibration procedure, AR-13.
1 Apr 65, 8p
Contract N123 62861 35059A Unclassified report
NAVWEPS 17-20AR-13

Descriptors: (*Test equipment(Electronics), Voltmeters), (*Voltmeters, Calibration), Power supplies, Direct current, Alternating current, Instruction manuals, Test methods.

The manual describes the calibration procedure for the Industrial Instrument Model P-2 Voltage Breakdown Tester, which is essentially a variable AC - DC high voltage power supply having a breakdown indicator relay and panel-mounted voltmeter.

PB-168 176 Field 9C, 14D
CFSTI Prices: HC$2.00 MF$0.50

Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
OSCILLOSCOPE.
Technical manual instrument calibration procedure, AW-17.
1 Apr 65, 35p NAVWEPS-17-20AW-17
PB 181 528, superseded
Unclassified report

This rept. supersedes NAVWEPS-17-20AW-17, PB-181 528, dated 15 Mar 63.

Descriptors: (*Oscilloscopes, Calibration), (*Calibration Oscilloscopes), Test equipment(Electronics), Instruction manuals, Electronic equipment, Broadband.

The procedure describes the calibration of the Hewlett-Packard 160A, 160B, H02-160B, 160BR, H02-160BR, 170A, E03-170A, H02-170A, 170AR, E03-170AR, H02-170AR, 170B, 170BR, E03-170B, and E03-170BR; the Hickok 1804, 1804A, 1804R, 1807, 1807A, and 1807R; and the OS-82/USM-105, OS-82A/USM-105A, OS-120/USM-139, OS-121/USM-140, OS-121A/USM-140A, OS-122B/USM-140B, OS-122/USM-141, OS-122A/USM-141A, and OS-129/ASM-35 oscilloscopes, which are broadband laboratory oscilloscopes with calibrated sweeps, sweep magnification, a square-wave voltage calibrator, provisions for preset or adjustable triggering from either internal or external sources, and the necessary power supplies. (Author)

PB-168 177 Field 9C, 14D
CFSTI Prices: HC$1.00 MF$0.50

Boeing Co., Seattle, Wash. Aero-Space Div.
RF MILLIVOLTMETER 411A (HEWLETT-PACKARD).
Technical manual instrument calibration procedure, AE-32.
15 Mar 65, 11p
Contract N123 62861 35056A Unclassified report
NAVWEPS 17-20AE-32

Descriptors: (*Voltmeters, Calibration), (*Test equipment(Electronics), Calibration), Instruction manuals, Radiofrequency power, Test methods.

The procedure describes the calibration of the Hewlett-Packard 411A RF Millivoltmeter, with the Type 411A-21E probe, which is portable and capable of measuring radio frequency voltages from below 10 millivolts to 10 volts over a frequency range of 500 kc through 500 Mc.

PB-168 237 Field 9A, 14D
CFSTI Prices: HC$1.00 MF$0.50

Boeing Co., Seattle, Wash. Aero-Space Div.
FERRITE MODULATOR MODEL 920-NA (CASCADE RESEARCH).
Technical manual instrument calibration procedure, GN-11.
15 Mar 65, 14p
Contract N123 62861 35056A Unclassified report
NAVWEPS 17-20GN-11

Descriptors: (*Modulators, Calibration), (*Calibration, Modulators), Waveguides, X band, Amplitude modulation, Test methods, Instruction manuals, Electronic equipment, Test equipment(Electronics), Standing wave ratios, Attenuation, Modulation.

The procedure describes the calibration of the Cascade Research model 920-NA ferrite modulator.

PB-168 238 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
OSCILLOSCOPE, 647 DUAL-TRACE PREAMPLIFIER, TYPE 10A2 TIME BASE, TYPE 11B1 (TEKTRONIX).
Technical manual instrument calibration procedure, AW-32.
15 Apr 65, 19p NAVWEPS-17-20AW-32
Unclassified report

Descriptors: (*Oscilloscopes, Calibration), (*Test equipment(Electronics), Calibration), Instruction manuals, Test methods, Tests, Laboratory equipment.

The procedure describes the calibration of the Tektronix 647 oscilloscope with the Tektronix type 10A2 dual-trace preamplifier and type 11B1 time base installed. This combination provides a broadband laboratory oscilloscope, with a calibrated main sweep, sweep magnification, a square-wave calibrator, provisions for automatic or adjustable triggering from either internal or external sources, and the necessary power supplies. (Author)

PB-168 239 Field 9C, 14D
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
DC MICROVOLT-AMMETER 203A, 203AR OR 203A/ER 3431 (KIN TEL).
Technical manual instrument calibration procedure, AQ-27.
1 May 65, 17p NAVWEPS-17-20AQ-27
Unclassified report

Descriptors: (*Multimeters, Calibration), (*Calibration, Multimeters), Voltmeters, Ammeters, Direct current, Instruction manuals.

The procedure describes the calibration of the Kin Tel 203A, 203 AR, or 203A/ER 3431 DC Microvolt-ammeter which measures full-scale direct voltages from 100 microvolts to 1000 volts, and full-scale direct currents from 1 millimicron ampere to 1 ampere. The Test Instrument consists of an input voltage divider, a chopper amplifier, an amplifier, and a meter.

PB-168 240 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
MEGOHMETERS: CONSTANT VOLTAGE TYPES TO 1000 MEGOHMS (100 TO 1000 VOLTS).
Technical manual instrument calibration procedure, AR-11.
1 Apr 65, 14p NAVWEPS-17-20AR-11
Unclassified report

Descriptors: (*Ohmmeters, Calibration), (*Calibration, Ohmmeters), Instruction manuals, Resistance-(Electrical), Voltage, Test methods.

The procedure describes the calibration of megohmmeters, which are designed to measure insulation resistance of cables and electrical equipment. (Author)

PB-168 241 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
L-C METER TEKTRONIX 130.

Technical manual instrument calibration procedure, AQ-28.
1 Jun 65, 8p NAVWEPS-17-20AQ-28
Unclassified report

Descriptors: (*Multimeters, Calibration), (*Calibration, Multimeters), Inductance, Capacitance, Instruction manuals, Measurement, Test methods.

The Tektronix 130 L-C meter indicates inductance and capacitance directly on a calibrated meter. A guard voltage circuit is included to prevent the stray capacitance of nearby conducting materials from affecting the measured capacitance. The meter is designed for the rapid measurement of inductance and capacitance where possible errors in the order of 5% are permissible. The Tektronix 130 L-C meter is calibrated by connecting standard values of capacitance and inductance to the input, and verifying that the indications obtained are within tolerance.

PB-168 242 Field 9C
CFSTI Prices: HC$2.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
OSCILLOSCOPES 316, RM16, RS16, 317, RM17 (TEKTRONIX).
Technical manual instrument calibration procedure, AW-26.
15 May 65, 30p NAVWEPS-17-20AW-26
Unclassified report

Descriptors: (*Oscilloscopes, Calibration), (*Calibration, Oscilloscopes), Instruction manuals, Test methods, Tests.

The procedure describes the calibration of the Tektronix 316, RM16, RS16, 317, and RM17 oscilloscopes, which are portable broadband oscilloscopes with calibrated sweep rates, calibrated vertical sensitivities, a square-wave calibrator, and provisions for automatic or adjustable triggering from either internal or external sources. (Author)

PB-168 243 Field 9C
CFSTI Prices: HC$2.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
ELECTRONIC COUNTERS.
Technical manual instrument procedure, AF-11.
15 May 65, 36p NAVWEPS-17-20AF-11
PB 181 621 superseded
Unclassified report

This rept. supersedes NAVWEPS-17-20AF-11, dated 1 Aug 63, PB-181 621.

Descriptors: (*Electronic equipment, Counting methods), (*Calibration, Electronic equipment), Instruction manuals, Voltage, Measurement, Test equipment-(Electronics).

The procedure describes the calibration of electronic counters. The power supply voltages are measured with an accurate d-v EVM. Regulation of regulated voltages is verified by measuring these voltages with a d-v EVM when the line voltage is adjusted to 105 and 125 volts. The ripple voltage on each supply voltage is measured with an a-v EVM.

PB-168 244 Field 9C
CFSTI Prices: HC$3.00 MF$0.75

Bureau of Naval Weapons, Washington, D. C.
SIGNAL GENERATOR TS-510/U, P/O AN/USM-44
TS-510A/U, P/O AN/USM-44A 608A, 608B, 608C, 608D HO1-608C/CR (HEWLETT-PACKARD).
Technical manual instrument calibration procedure, AG-06.
1 May 65, 55p NAVWEPS-17-20AG-06
PB 181 622
Unclassified report

This report supersedes PB-181 622, revised 1 Jun 62.

Descriptors: (*Signal generators, Calibration), (*Calibration, Signal generators), Instruction manuals, Test equipment(Electronics), Test methods.

The procedure describes the calibration of the HP 608A, 608B, 608C, HO1-608C/CR, 608D, TS-510/U (P/O AN/USM-44), or TS-510 A/U (P/O AN/USM-44A) signal generator. Each unit has provisions for external pulse modulation and internal or external sine-wave modulation. The HP 608D, HO1-608C/CR, TS-510/U, and TS-510 A/U units each have a crystal-controlled heterodyne calibrator providing test points over the entire frequency range. (Author)

PB-168 246 Field 9C
CFSTI Prices: HC$2.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
FM-AM SIGNAL GENERATOR 202H, 202J UNIVERTER, 207H WITH SIGNAL GENERATOR 202H OR 202J (BOONTON).
Technical manual instrument calibration procedure, AG-99.
15 Mar 65, 32p NAVWEPS-17-20AG-99
Unclassified report

Descriptors: (*Signal generators, Calibration), (*Calibration, Signal generators), (*Frequency multipliers, Calibration), Instruction manuals, Test equipment(Electronics), Radio signals, Medium frequency, High frequency, Very high frequency.

The procedure describes the calibration of the Boonton 202H or 202J signal generator, and the 207H univerter with the 202H or 202J signal generator. The signal generator is designed to produce radio frequency signals from 0.1 microvolts to 0.2 volts, modulated or unmodulated, AM or FM, over a frequency range of 54 to 216 Mc (Boonton 202H) and 195 to 270 Mc (Boonton 202J). The univerter extends the frequency range of the Boonton 202H or 202J signal generator from 100 kc to 55 Mc. (Author)

PB-168 247 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Boeing Co., Seattle, Wash. Aero-Space Div.
POWER TEST SET TS-627/U INDUSTRIAL ANALYZER MODEL 639, TYPE 2 (WESTON) TYPE TA (WESTINGHOUSE).
Technical manual instrument procedure, AQ-37.
1 May 65, 17p
Contract N123 62861 35056A Unclassified report
NAVWEPS 17-20AQ-37

Descriptors: (*Test sets, Calibration), (*Calibration, Test sets), Test equipment(Electronics), Instruction manuals, Test methods, Power meters, Measuring devices(Electrical + electronic).

The procedure describes the calibration of the TS-627/U power test set or the Weston Model 639 Type 2 industrial analyzer. The Westinghouse Type TA industrial analyzer can also be calibrated with this procedure providing care is used in making connections and operation of controls which will differ from those described in the text of the procedure. (Author)

PB-168 248 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Boeing Co., Seattle, Wash. Aero-Space Div.
SUMMATION BRIDGE AN/URM-24.
Technical manual instrument calibration procedure, GP-08.
15 May 65, 17p
Contract N123 62861 35056A
NAVWEPS 17-20GP-08
Unclassified report

Descriptors: (*Electric bridges, Calibration), (*Calibration, Electric bridges), Instruction manuals, Test equipment(Electronics), Test methods, Power meters, Radiofrequency power, Superhigh frequency.

The procedure describes the calibration of the AN/URM-24 Summation Bridge, which consists of the TS-730/URM Summation Bridge and the MX-1310/URM-24 Power Measuring Kit. The summation bridge is a radio frequency power meter capable of measuring 5 milliwatts to 5 watts of power in the 4 to 10 Gc frequency range.

PB-168 249 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
COAXIAL LOW-PASS FILTERS SIERRA 184 SERIES.
Technical manual instrument calibration procedure, GN-10.
1 May 65, 16p NAVWEPS-17-20GN-10
Unclassified report

Descriptors: (*Low-pass filters, Calibration), (*Calibration, Low-pass filters), Instruction manuals, Coaxial cables, Test equipment-(Electronics), Test methods.

The procedure describes the calibration of the Sierra 184 series low-pass filters which are intended for the elimination of harmonics in coaxial systems. (Author)

PB-168 250 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
BATTERY TESTERS TS-183/U, TS-183A/U, TS-183B/U.
Technical manual instrument calibration procedure, AE-46.
1 May 65, 10p NAVWEPS-17-20AE-46
Unclassified report

Descriptors: (*Test equipment, Batteries + components), (*Calibration, Test equipment), Instruction manuals, Test methods, Voltage.

The procedure describes the calibration of the TS-183/U, TS-183A/U, or TS-183B/U battery tester. (Author)

PB-168 251 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
SWEEP OSCILLATOR 686C (HEWLETT-PACKARD).
Technical manual instrument calibration procedure, GG-17.
15 May 65, 21p NAVWEPS-17-20GG-17
Unclassified report

Descriptors: (*Microwave oscillators, Sweep generators), (*Calibration, Microwave oscillators), Superhigh frequency, Radiofrequency power, Instruction manuals, Test equipment(Electronics), Test methods.

The procedure describes the calibration of the Hewlett-Packard 686C sweep oscillator which is a general purpose oscillator with a relatively high power output at frequencies of 8.2 to 12.4 Gc. (Author)

10. Energy Conversion (Non-propulsive)

AD-425 895 Field 10A, 11F
CFSTI Price: HC$4.00

Thermo Electron Engineering Corp., Waltham, Mass.
THERMIONIC EMITTER MATERIALS RESEARCH PROGRAM.
Annual technical summary rept. no. 2, 1 Jul 62-30 Sep 63, by S. S. Kitrilakis and J. H. Weinstein. 30 Sep 63, 111p Rept. no. 27-64
Contract NONR356300
Unclassified report

Descriptors: (*Thermionic converters, Materials), (*Rhenium, Thermionic converters), (*Iridium, Thermionic converters), Performance(Engineering), Energy conversion, Molybdenum, Emissivity, Electric currents, Experimental data, High-temperature research, Voltage, Work functions.

The performance, over a wide range of parameters, of rhenium and iridium as thermionic emitter materials opposite molybdenum collectors, is reported. The results represent an extension and refinement of the work performed during the first year of the program. A study of molybdenum-collector work function opposite three different emitter materials is reported, and a correlation against collector-to-reservoir temperature ratio is shown to exist. Emitter work functions are reported, and a correlation against emitter-to-reservoir temperature ratio is demonstrated and shown to correspond to Rasor's theoretical predictions. A correlation between converter internal voltage loss and the product of cesium pressure and interelectrode spacing is demonstrated, and the relationship between this factor and the optimum performance maps is derived. The usefulness of the data and correlations to the theoretician and the hardware designer is delineated. (Author)

N65-19776-N65-19783 Field 10A
CFSTI Prices: HC$3.00 MF$0.75

Institute for Direct Energy Conversion, Univ. of Pennsylvania, Philadelphia.
RESEARCH IN THE CONVERSION OF VARIOUS FORMS OF ENERGY BY UNCONVENTIONAL TECHNIQUES.
Status rept.
4 Jan 65, 99p INDEC-SR-5
Grant NSG316 Unclassified report
NASA CR-57331

Descriptors: (*Energy conversion, Scientific research).

N65-21639 Field 10B, 20M
CFSTI Prices: HC$6.00 MF$1.25

Electro-Optical Systems, Inc., Pasadena, Calif.
BRAYTON CYCLE SOLAR COLLECTOR STUDY, by D. E. Stewart. Apr 65, 226p
Contract NAS3 2782 Unclassified report
NASA CR-195

Descriptors: (*Solar panels, Brayton cycle), (*Brayton cycle, Solar panels), Mirrors, Design.

N65-23172 Field 10B, 10A, 10C, 11F
CFSTI Prices: HC$4.00 MF$0.75

Thompson Ramo Wooldridge, Inc., Cleveland, Ohio.
OPERATION OF A HAYNES ALLOY NO. 25 FORCED CIRCULATION LOOP TO STUDY THE EFFECTS OF HYDROGEN IN A SIMULATED SUNFLOWER SYSTEM,
by R. C. Schulze and D. B. Cooper. May 65, 116p
Contract NAS5 462
NASA CR-225
Unclassified report

Descriptors: (*Corrosion-resistant alloys, Heat exchangers), (*Power equipment, Corrosion-resistant alloys).

11. Materials

AD-415 847 Field 11F, 20L
CFSTI Price: HC$4.00

Massachusetts Inst. of Tech., Cambridge. Dept. of Metallurgy.
SUPERCONDUCTIVITY IN THE NIOBIUM-TIN SYSTEM,
by Ronald Edward Enstrom. May 63, 114p
Scientific rept. SR-7
Contract Nonr184178, Proj. DSR8848; ARPA Order 21462
Unclassified report

This report is identical to a thesis submitted for the degree of Doctor of Science.
Available copy will not permit fully legible reproduction.

Descriptors: (*Superconductivity, Alloys), (*Niobium alloys, Superconductivity), (*Tin alloys, Superconductivity), (*Cryogenics, Superconductivity), Solid solutions, Phase studies, Heat treatment, Magnetic fields, High-temperature research, Microstructure, Powder metals, Sintering, Powder metallurgy, Density, Photomicrography, Data, Diffusion, Voltage.

The critical current, temperature, and field of composite Nb-Sn wires and sintered Nb-Sn powder compacts of varying composition were found to depend on the properties and distribution of the phases present after heat treating at temperatures up to 1500 C. A voltage drop was used to judge the onset of normal behavior in specimens carrying up to 100,000 amps/sq. cm which were tested in fields up to 90,000 gauss and at temperatures ranging from 4.2 to 1.95 K. The temperature ranges of stability for Nb3Sn, Nb3Sn2, Nb2Sn3 and a terminal solid solution of Sn in Nb were determined and a tentative phase diagram proposed. The transition temperature for Nb2Sn3 varies from 3.4 to 2.4 K. The Nb solid solution has a critical field of 10,500 gauss and a critical current density of 4,400 amps/sq. cm at 2.2 K in a 10,000 gauss field. A systematic decrease in critical current density occurs with increasing heat treating temperature for composite wires heat treated at temperatures above 1000 C for 6 minutes. This decrease appears to be associated with a decrease in interstitial content in the Nb3Sn, or the annealing out of chemical inhomogeneities that may be responsible for high-field, high-current superconductivity. (Author)

AD-450 566 Field 11F, 11C
CFSTI Prices: HC$1.00

Springfield Armory, Mass.
EFFECT OF ULTRASONIC CLEANING ON CORROSION RESISTANCE OF PHOSPHATE-COATED PANELS.
Technical rept.,
by M. S. Spivak. 2 Oct 64, 22p
Rept. no. SA-TR16-1122
Proj. M1 3 23001 01M1M6
Unclassified report

Rept. on Evaluation of Cleaning Methods and Procedures Applicable to Small Arms.

Descriptors: (*Steel, Phosphate coatings), (*Phosphate coatings, Corrosion inhibition), (*Ultrasonic radiation, Cleaning), Phosphates, Manganese compounds, Zinc compounds, Cleaning compounds, Water, Oils, Coatings, Salt spray tests, Chromic acids, Protective treatments.

Zinc and manganese phosphated steel panels were exposed to high frequency vibrations in various media to determine the effect of this cleaning procedure on the corrosion resistance of the coated panels. Phosphated panels showed diminished corrosion resistance after exposure to these vibrations in water and water-based cleaners, but were not affected after exposure to ultrasonics when trichloroethylene was used as the medium. Phosphate-coated panels ultrasonically cleaned and then treated with supplementary oil exhibited relatively the same corrosion resistance as oiled phosphated panels not exposed to ultrasonic vibrations. Test procedure is given and results are discussed. (Author)

N65-25273 Field 11C, 22B
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
PROPERTIES OF TWO WHITE PAINTS FOR APPLICATION TO INFLATABLE SPACECRAFT: TITANIUM-DIOXIDE-PIGMENTED EPOXY AND ZINC-OXIDE-PIGMENTED METHYL SILICONE ELASTOMETER,
by Charles V. Woerner. Jun 65, 21p NASA-TN-D-2834
Unclassified report

Descriptors: (*Inflatable structures, Paints), (*Paints, Spacecraft), (*Spacecraft, Paints).

N65-25275 Field 11F
CFSTI Prices: HC$3.00 MF$0.75

Curtiss-Wright Corp., Caldwell, N. J.
AN APPROACH TO METAL FATIGUE,
by F. B. Stulen, J. H. Redfern, and W. C. Schulte.
Jun 65, 83p
Contract NAS1 3170
NASA CR-246
Unclassified report

Descriptors: (*Metals, Fatigue(Mechanics)), (*Fatigue(Mechanics), Metals), Titanium alloys, Molybdenum alloys, Vanadium alloys.

Patent 3,192,012 Field 11F, 7B

PROCESS FOR SEPARATING THE RARE EARTH ELEMENTS BY MEANS OF SOLVENT EXTRACTION.
Patent assigned to Interior,
by Andrew C. Rice. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Rare earth elements, Solvent extraction), Complex compounds, Chemical precipitation, Amines, Organic solvents, Ethlyenedinitrilo tetraacetes, Ores-(Metal sources), Separation, Cyclohexanes, Acetates, Ethylenediamine, Nitriles, Patents.

The rare earths are obtained from ore concentrates of the oxides. Separation may be achieved by a liquid-liquid fractional solvent extraction process using an amine. The process may be improved by the addition of a complexing agent such as diethylemetriamine pentaacetic acid.

Patent 3,192,239 Field 11H, 7C

PROCESS FOR ADDITION OF ARYLTHIOLS, PHENOLS AND PHENYL ETHERS TO UNSATURATED FATTY ACIDS.
Patent assigned to Agriculture,
by Waldo C. Ault and Abner Eisner. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Fatty acids, Addition reactions), (*Lubricant additives, Preparation), (*Antioxidants, Preparation), Aromatic compounds, Polycyclic compounds, Thiols, Phenols, Ethers, Sulfonates, Fatty acid esters, Patents.

The process is for the addition of mercoptoaromatic or hydroxylated aromatic compounds to olefinically unsaturated fatty acids. The aryl and polycyclic addition compounds to such fatty acids and esters thereof are used as lubricant additives and antioxidants.

Patent 3,193,500 Field 11H

EXTREME PRESSURE LUBRICANT.
Patent assigned to Gulf Research and Development Co., Pittsburgh, Pa.,
by Robert J. Hartle. 6 Jul 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Lubricant additives, Organic phosphorus compounds), (*Organic phosphorus compounds, Lubricant additives), (*Organic sulfur compounds, Lubricant additives), Molybdenum compounds, Tungsten compounds, Phosphates, Sulfides, Chlorine compounds, Pressure, Antioxidants, Salts, Patents.

Molybdenum and tungsten salts of organic substituted dithiophosphoric acids are used as additives to lubricants to improve their extreme pressure characteristics. The lubricant contains a major amount of lubricating oil and from 0.05 to 5 percent by weight of molybdenum and tungsten salts. The lubricating oil may also include anti-rust agents, antioxidants and other additives.

Patent 3,193,501 Field 11H

EXTREME PRESSURE LUBRICANT COMPOSITIONS.
Patent assigned to Sinclair Research, Inc., Wilmington, Del.,
by Howard J. Matson. 6 Jul 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Lubricant additives, Organic phosphorus compounds), (*Organic phosphorus compounds, Lubricant additives), (*Organic sulfur compounds, Lubricant additives), Mineral oils, Monocyclic compounds, Chlorine compounds, Phosphates, Sulfides, Pressure, Wear resistance, Ethers, Patents.

A minor amount of the reaction mixture of an O,O-dialkyl phosphorodithionate and a chlorinated cyclopentadiene/diallyl sulfide compound is utilized as an anti-wear and extreme pressure additive for oils and greases. A 1:1 molar ratio adduct of sulfide and pentadiene containing 4 to 6 chlorine atoms is reacted with equal portions of O,O-dimethyl phosphorodithionate at temperatures from 80 to 140 degrees C. The resulting composition is added to naphthenic, paraffinic, or complex ester-type oils of lubricating viscosity in an amount ranging from 0.2 to 5 percent by weight of the final product. The lubricant is suitable for machinery and engines sustaining temperatures to 450 degrees F.

PB-168 013 Field 11F
CFSTI Prices: HC$3.00 MF$0.50

Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
STUDY OF U-Pu-Fe ALLOYS (MASURCA CRITICAL EXPERIMENT) (Etude d'Alliages U-Pu-Fe (Experience Critique Masurca)),
by Pierre Barthelemy and Rene Boucher. Jul 65, 51p Rept. no. CEA-R-2792
Unclassified report

Text in French, attached summary in English.

Descriptors: (*Uranium alloys, Plutonium alloys), Iron alloys, Casting, Degradation, Oxidization, Transition temperature, Thermal conductivity, Phase studies, Elasticity, Density, Heat of fusion, Compatibility, France.

Three compositions have been studied: 73.5 U 25 Pu 1.5 Fe (weight %) 74 U 25 Pu 1 Fe, 74.5 U 25 Pu 0.5 Fe. Elaboration and Casting are easy. After two weeks in air 74.5 U - 25 Pu - 0.5 Fe alloys are reduced in powder. As-cast alloys containing 1 and 1.5% Fe are kepted undamaged during several months. A rapid oxidization of the alloys is however observed when the samples undergo the phase transformation (at 595 C and 590 C respectively). Ignition tests in the presence of air show that the oxidization starts at about 250 C and that the reaction does not spread. Ignition is not observed during heating from 20 to 660 C. The transformation temperature, the melting temperature and the thermal expansion coefficients have been determined by dilatometry. Below the transformation temperature, the principal phases are U-Pu zeta and (U, Pu)6Fe. Thermal conductibility, Young modulus, density and heat of fusion have been measured. Compatability tests show that between U-Pu-Fe and stainless steel a phase of (U,Pu)6Fe type is formed. The 74 U - 25 Pu - 1% Fe alloy seems to behave better than 73.5 U - 25 Pu - 1.5% Fe alloy because the (U, Pu)6Fe layer is two or three times smaller. Finally, the thermal stability has been studied with the 74 U - 25 Pu - 1% Fe alloy. A dilatometric anomaly (very weak expansion) occurs when the sample is heated above transformation temperature and cooled. But there is no anomaly by thermal cycling from 50 C to 400 C and there is no deterioration of alloys by heat treatments at 100 C, 200 C, 300 C during 5 months under vacuum. (Author)

SB-420 Suppl. 1 Field 11F

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
PLATINUM AND ALLIED METALS.
Price list, selective bibliography of Government research repts. and translations for Jul 60-May 65.
May 65, 19p Unclassified report

Available free from the Clearinghouse. See also SB-420.

Descriptors: (*Platinum, Bibliographies), Electrodes, Fuel cells, Diffusion, Thermal properties, Copper alloys, Palladium alloys, Gold, Niobium alloys, Molybdenum alloys, Coatings, Nickel alloys, Beryllium alloys, Silver alloys, Foils, Processing.

Lists 248 domestic and foreign references on platinum and allied metals added to the CFSTI collection during the period July 1960 through May 1965. Includes research on fuel cells using platinum electrodes; stacking faults and diffusion in platinum; high temperature and thermal expansion of platinum; thermodynamic properties of copper-palladium alloys; quench hardening in platinum and gold; platinized platinum electrodes; study of ductile coatings for the oxidation protection of columbium and molybdenum alloys; decomposition by platinum; vacuum fusion techniques using platinum nickel and platinum baths; platinum plating of titanium and its alloys; action of helium on platinum; frequency spectrum of nickel-palladium alloys; extraction of gold, platinum with isoamyl alcohol; ways were sought for making thin foils of platinum; structure of the alloys of beryllijm with silver, palladium and gold; etc.

12. Mathematical Sciences

AD-280 827 Field 12A
CFSTI Price: HC$1.00

Mathematics Research Center, Univ. of Wisconsin, Madison.
SOME EXTREMAL QUESTIONS FOR SIMPLICIAL COMPLEXES II. ON THE 'RADIUS TIMES PERIPHERY' PROBLEM FOR AREA,
by L. C. Young. Apr 62, 17p
Technical summary rept. no. MRC-TSR-307
Contract DA11 022ORD2059
Unclassified report

See also AD-298 806.

Descriptors: (*Algebraic topology, Convex sets), Theory, Numerical methods and procedures, Topology, Geodesics, Inequalities.

N65-22366 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
ON DEDUCTION OF CERTAIN NONLINEAR DIFFERENTIAL EQUATIONS FROM THEIR SOLUTIONS,
by Murray Tabak. May 65, 8p NASA-TN-D-2779
Unclassified report

Descriptors: (*Nonlinear differential equations, Numerical methods + procedures).

N65-23829 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Houston, Tex. Manned Spacecraft Center.
AN APPLICATION OF GENERALIZED MATRIX INVERSION TO SEQUENTIAL LEAST SQUARES PARAMETER ESTIMATION,
by Henry P. Decell, Jr. May 65, 13p NASA-TN-D-2830
Unclassified report

Descriptors: (*Matrix algebra, Least squares method), (*Least squares method, Matrix algebra).

PB-167 476 Field 12A, 9F
CFSTI Prices: HC$5.00 MF$1.25

Antenna Lab., Ohio State Univ. Research Foundation, Columbus.
TABLES OF INTEGRAL FROM O TO U OF J SUB O (LAMBDA X) EXP(IX)DX.
15 Jun 54, 196p Technical rept. no. TR-510-10
Contract DA36 039sc15554, Projs. 22 122 B, 3 99 05 022
AD 43 483
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Integrals, Tables), (*Antenna radiation patterns, Integrals), Broadband, Antennas, Series.

As a part of the calculation of the radiation pattern of a discone antenna the evaluation of the integral from O to U of J sub O (lambda x) exp(ix)dx became necessary. This integral occurs in other places both in electromagnetic theory and other fields of engineering and physics. One tabulation of I was published some time ago but it was necessary to extend the range of the parameters lambda and u for this application. For lambda < 1.6, the tangent law was used and for 1.6 < lambda < 10, Simpson's formula was used. The integral was tabulated for 0 < lambda (0.1) < or = 10 and 0 < or = u(0.02) < or = 10 with the added provision lambda u < or = 15. The following bounds for the error are given: (1) lambda < or = 1.6 - error < 0.000001 x 50 u. (2) lambda > 1.6 - error < 0.0000022.

PB-167 556 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
THE INFLUENCE OF DAMPING FACTORS,
by Walter Rudin. Mar 61, 10p
Technical summary rept. no. MRC-TSR-220
Contract DA11 022ORD2059
AD 254 723
Unclassified report

Descriptors: (*Sequences, Integral equations), Difference equations, Series, Trigonometry, Fourier analysis, Numbers.

PB-167 773 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Case Inst. of Tech., Cleveland, Ohio. Dept. of Mathematics.
ESTIMATION OF RESPONSE FUNCTION IN A DYNAMIC REGRESSION MODEL,
by Zakkula Govindarajulu and Yukio Suzuki.
Jul 64, 19p Rept. no. 201
Grant NSF GP569
Unclassified report

Descriptors: (*Functions, Linear systems), (*Mathematical models, Functions), (*Analysis of variance, Linear systems), Least squares method, Optimization.

The impulse response function is estimated in a time-invariant, linear system for the input in a finite time interval and observation of output at discrete time points. The time-discrete and time-continuous models are discussed. The criterion of optimality used is the minimum square error. For the time-discrete model, the 'dead time' between input and output, and the replication of observations are also discussed. (Author)

PB-167 774 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Case Inst. of Tech., Cleveland, Ohio. Dept. of Mathematics.
BEST ESTIMATES OF LOCATION AND SCALE PARAMETERS OF A DOUBLE EXPONENTIAL POPULATION USING ORDERED OBSERVATIONS,
by Zakkula Govindarajulu. Jul 64, 17p
Rept. no. 202 Unclassified report
Grant NSF GP569

Descriptors: (*Least squares method, Population-(Mathematics)), (*Statistical distributions, Least squares method), (*Population(Mathematics), Measure theory), Analysis of variance, Sampling, Distribution theory.

Closed-form expressions for the first two moments and the product (linear) moments of the double exponential order statistics are obtained. Expressions for generalized least squares estimates of location and scale parameters based on symmetrically censored samples and for their variances are also obtained. Expected values of order statistics in random samples of size N drawn from the standard double exponential population are evaluated accurate to six decimal places for N = 2(1)30(10)100 and these are presented. The covariances of these order statistics, accurate to five decimal places are given for N = 2(1)20. Least squares estimates of location and scale parameters of the double exponential population, using ordered observations in complete and all possible symmetrically censored samples are presented, accurate to four decimal places, for N = 2(1)20. (Author)

PB-167 866 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Purdue Univ., Lafayette, Ind. Center of Applied Stochastics.
ON RELATIONS BETWEEN MOMENT PROPERTIES AND ALMOST SURE LYAPUNOV STABILITY FOR LINEAR STOCHASTIC SYSTEMS.
Rept. no. 2, ser. 1,
by Frank Kozin. 1964, 21p
Unclassified report

Descriptors: (*Stochastic processes, Linear systems), (*Stability, Linear systems), Probability, Analysis of variance, Measure theory, Differential equations, Matrix algebra.

A sufficient condition for almost sure asymptotic hyapunov stability in the large is established in terms of a relatively direct moment property.

PB-167 909 Field 12B
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
APPLICATION OF THEORY OF GAMES TO IDENTIFICATION OF FRIEND AND FOE,
by R. Bellman, D. Blackwell, and J. LaSalle.
28 Jul 49, 19p Rept. no. RM-197 Unclassified report
AD 224 339

Descriptors: (*Identification systems, Military tactics), (*Game theory, Identification systems), Warfare, Identification.

PB-167 930 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
STUDY OF SOME ARITHMETIC PROPERTIES OF POISSON'S DISTRIBUTION (Etude de Quelques Proprietes Arithmetiques de la Distribution de Poisson),
by Jacques Freycenon. Jan 65, 24p CEA-R-2635
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Distribution theory, Functions), Analysis of variance, Probability, France.

A random number n following a Poisson probability distribution function, which is derived by a constant a (n = am + b) is considered. The probability distribution of the remainder b and of the quotient m is studied. The mean and mean-squared values of m and b are computed. A numerical example shows that the distribution of the remainder may be likened to a rectangular distribution when the divisor is < or = 32 for n = 1000. The knowledge of b is then not significant of the measure of n until this value of a is reached. (Author)

PB-168 014 Field 12A
CFSTI Prices: HC$3.00 MF$0.75

Columbia Univ., New York. Dept. of Mathematics.
SHEAVES WITH VALUES IN A CATEGORY. I,
by John W. Gray. 1962, 59p
Rept. no. CU-5-62-NSF-G19022-M
Grant NSF G19022
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Algebraic topology, Theorems), Operators(Mathematics), Transformations(Mathematics).

PB-168 015 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Columbia Univ., New York. Dept. of Mathematics.
A DECOMPOSITION THEORY FOR REPRESENTATIONS OF C*-ALGEBRAS,
by Edward G. Effros. 1962, 48p
Rept. no. CU-4-62-NSF-G19022-M
Grant NSF G19022
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Algebras, Measure theory), (*Measure theory, Algebras), (*Conformal mapping, Algebras), Topology, Functional analysis.

PB-168 016 Field 12A
CFSTI Prices: HC$3.00 MF$0.75

Stanford Univ., Calif. Applied Mathematics and Statistics Labs.
ON SUFFICIENCY AND CONDITIONAL SUFFICIENCY,
by D. A. S. Fraser. 29 Jun 62, 59p
Technical rept. TR-10 Unclassified report
Grant NSF G19058

Descriptors: (*Statistical functions, Distribution theory), Probability.

The likelihood function as the minimal sufficient statistic is used to generate necessary statistics, to analyze the Koopman-Darmois-Pitman problem, and to examine some aspects of inference locally on the parameter space. In Part II a local ancillary statistic and a locally conditionally sufficient statistic are developed. Problems of local estimation are considered and the large sample conditional distribution determined. (Author)

PB-168 017 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Berkeley. Dept. of Mathematics.
ON THE WIENER AND FEYNMAN INTEGRALS FOR BAD POTENTIALS,
by Jacob Feldman. Jul 62, 38p
Grant NSF G19136

Unclassified report

Descriptors: (*Integrals, Potential theory), (*Potential theory, Integrals), Green's function, Groups(Mathematics), Operators(Mathematics), Motion.

Contents: Brownian motion in k dimensions, The semigroup obtained from a potential V, The infinitesimal generator, Complexification of the semigroup and the limiting Feynman integral, The Green's function.

PB-168 019 Field 12A
CFSTI Prices: HC$3.00 MF$0.75

Stanford Univ., Calif. Applied Mathematics and Statistics Labs.
MULTIVARIATE TESTS OF HYPOTHESES WITH INCOMPLETE DATA.,
by Raghu Nandan Prasad Bhargava. 31 Aug 62, 87p
Technical rept. TR-3
Grant NSF G19138

Unclassified report

Descriptors: (*Statistical tests, Optimization), Distribution theory, Sampling, Probability.

Consider a sample from a multivariate normal population in which some of the observations are missing. These missing observations form a certain pattern which we call a monotone sample. The present paper deals with a discussion of the maximum likelihood estimates of the parameters for a monotone sample which are then used in providing likelihood ratio tests for many multivariate problems, e.g., Hotelling's T square, Wilks' tests, general linear hypothesis, etc. In each case the results generalize the usual statistics when there are no missing observations. (Author)

PB-168 020 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Stanford Univ., Calif. Applied Mathematics and Statistics Labs.
SUBFIELDS THAT ARE ALGEBRAICALLY CLOSED IN THE FIELD OF ALL MEROMORPHIC FUNCTIONS,
by S. Hellerstein and L. A. Rubel. 8 Jan 63, 11p
Technical rept. TR-3
Grant NSF G19701

Unclassified report

Descriptors: (*Functions, Algebra), (*Algebra, Functions), Theory.

PB-168 021 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Stanford Univ., Calif. Applied Mathematics and Statistics Labs.
DUALITY FOR COMPACT GROUPS.
Technical rept. no. TR-4,
by J. L. Kelley. 22 Jan 63, 6p
Grant NSF G19701

Unclassified report

Descriptors: (*Groups(Mathematics), Algebraic topology), (*Linear programming, Groups(Mathematics)), Algebras, Functions.

PB-168 026 Field 12A
CFSTI Prices: HC$3.00 MF$0.75

California Univ., Berkeley. Dept. of Mathematics.
HOLOMORPHIC COMPLETIONS, ANALYTIC CONTINUATION, AND THE INTERPOLATION OF SEMI-NORMS,
by Errett Bishop. Aug 62, 72p
Grant NSF G18974

Unclassified report

Descriptors: (*Functions, Algebraic topology), (*Algebraic topology, Functions), Complex numbers, Algebras, Functional analysis.

PB-168 027 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Colorado Univ., Boulder. Dept. of Mathematics.
SUMMARY OF WORK DONE UNDER THE PROJECT OF STUDIES IN QUADRATIC FORMS AND ALGEBRAIC CURVES.
Summary rept. for 1 Sep 61-1 Sep 63.
1 Sep 63, 8p
Grant NSF G19894

Unclassified report

Descriptors: (*Scientific research, Mathematics), (*Algebraic geometry, Polynomials), (*Polynomials, Algebraic geometry), Number theory, Matrix algebra.

PB-168 028 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Berkeley. Dept. of Mathematics.
RESTRICTIONS OF SUBSPACES OF C(X),
by T. W. Gamelin. Mar 63, 36p
Grant NSF G18974

Unclassified report

Descriptors: (*Algebras, Functional analysis), (*Functional analysis, Algebras), Combinatorial analysis, Algebraic topology.

PB-168 074 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Maryland Univ., College Park. Inst. for Fluid Dynamics and Applied Mathematics.
A GENERALIZATION OF THE GAUSS MEAN VALUE THEOREM AND ITS CONVERSE,
by James H. Bramble. Sep 63, 17p
Technical note BN-330 Unclassified report
Grant NSF GP3

Descriptors: (*Potential theory, Operators(Mathematics)), (*Operators(Mathematics), Potential theory), Partial differential equations, Functions, Integrals.

The purpose of this paper is to give a simple explicit mean value theorem and converse corresponding to a second order elliptic differential operator in N - dimensional space. This theorem is then employed to give another proof of a lemma of Weyl, which in turn is used to prove a compactness theorem for solution of elliptic equations.

PB-168 121 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Queens Coll., Flushing, N. Y.
A SEQUENTIAL PROCEDURE FOR SELECTING THE POPULATION WITH THE LARGEST MEAN FROM K NORMAL POPULATIONS,

by Edward Paulson. 1963, 17p Unclassified report
Grant NSF G23665
Descriptors: (*Population(Mathematics), Selection), (*Sequential analysis, Population(Mathematics)), Sampling, Analysis of variance, Decision theory.

In this paper sequential procedures are given for selecting the normal population with the greatest mean when (a) the k populations have a common known variance or (b) the k populations have known but unequal variances, or (c) the k populations have a common but unknown variance, so that in each case the probability of making the correct selection exceeds a specified value when the greatest mean exceeds all other means by a specified amount. The procedures in the present paper all have the property that inferior populations can be eliminated from further consideration as the experiment proceeds, which is an important feature distinguishing this from previous work on this problem. (Author)

PB-168 122 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

California Univ., Berkeley. Dept. of Mathematics.
A NOTE ON THE INITIAL-BOUNDARY VALUE PROBLEM FOR PARABOLIC DIFFERENTIAL EQUATIONS,
by H. Tanabe. May 63, 23p
Grant NSF G22982
Unclassified report

Descriptors: (*Boundary value problems, Partial differential equations), (*Partial differential equations, Boundary value problems), Functions, Operators-(Mathematics).

PB-168 123 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Queens Coll., Flushing, N. Y.
A SEQUENTIAL DECISION PROCEDURE FOR CHOOSING ONE OF k HYPOTHESES CONCERNING THE UNKNOWN MEAN OF A NORMAL DISTRIBUTION,
by Edward Paulson. 1956, 14p
Grant NSF G23665
Unclassified report

Descriptors: (*Sequential analysis, Decision theory), (*Distribution theory, Stochastic processes), Decision making, Statistical tests, Sampling.

A sequential procedure is given for deciding to which of k non-overlapping intervals the unknown mean theta belongs which satisfies the requirement that the probability of making an incorrect decision is less than some preassigned value alpha. The sequential procedure is worked out explicitly for the following two cases: (1) when theta is the mean of a normal distribution with a known variance, and (2) when theta is the mean of a normal distribution with an unknown variance. A brief discussion is also given of a related but apparently new problem, to find a sequential procedure which will simultaneously select one of the k intervals and also yield a confidence interval for theta of a specified width. (Author)

PB-168 124 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Berkeley. Dept. of Mathematics.
THE ESSENTIAL SPECTRUM OF A CLASS OF ORDINARY DIFFERENTIAL OPERATORS,
by E. Balslev and T. W. Gamelin. Jun 63, 36p
Grant NSF G22982 Unclassified report

Descriptors: (*Operators(Mathematics), Differential equations), Mapping(Transformations), Topology, Perturbation theory, Algebras.

A method is given of determining the essential spectrum of a class of ordinary differential operators in L of order P of an interval with infinity as a singular endpoint. The method relies on the mapping theorem for the essential spectrum, proved for ordinary differential operators by Rota (Communs. Pure App. Math. XI (1958), 23-65). A discussion of this type of theorem is presented. The essential spectrum of the constant coefficient operator and the Euler operator is determined. It is found that the essential spectrum of the Euler operator is an algebraic curve which varies with the index p, $1 < p <$ infinity. The class of differential operators which are compact with respect to the constant coefficient operator, or Euler operator, is determined. By a fundamental theorem of perturbation theory, these operators may be added to the original operator without altering the essential spectrum. The results apply to differential equations of Fuchsian type, including the Riemann differential equation, whose spectral theory was investigated by Rota (J. Math. and Mech. 10 (1961), 83-90).

PB-168 128 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Columbia Univ., New York. Dept. of Mathematics.
OUTER AUTOMORPHISMS OF CERTAIN p-GROUPS,
by Charles Godino. 1964, 12p
Grant NSF GP1904
Unclassified report

Descriptors: (*Groups(Mathematics), Mapping-(Transformations)), (*Mapping(Transformations), Groups(Mathematics)), Algebra.

By employing methods of Group Representation Theory, the existence of outer automorphisms of certain types of p-groups is established.

PB-168 129 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Columbia Univ., New York. Dept. of Mathematics.
SOME PROPERTIES OF FOLIATIONS,
by Richard Sacksteder. 1964, 11p
Rept. no. CU-3-NSF-GP-1904-M
Grant NSF GP1904
Unclassified report

Descriptors: (*Algebraic topology, Groups(Mathematics)), (*Mapping(Transformations), Algebraic topology), Graphics, Topology.

The possibility is investigated of applying the generalized Denjoy theorem to the question of whether all leaves of a manifold, having a foliated structure, are proper or locally dense if the manifold is compact and the foliation is of class C-squared.

PB-168 130 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Columbia Univ., New York. Dept. of Mathematics.
ON A QUESTION OF REEB,
by Richard Sacksteder. 1964, 9p
Rept. no. CU-1-NSF-GP1904-M
Grant NSF GP1904
Unclassified report

Descriptors: (*Algebraic topology, Mapping(Transformations)), Topology, Graphics.

An example of a 3-manifold with a C (infinity) foliated structure of co-dimension one is given in which there are exceptional leaves.

PB-168 131 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Columbia Univ., New York. Dept. of Mathematics.
THE INTEGRABILITY PROBLEM FOR G-STRUCTURES,
by Victor Guillemin. 1964, 39p
Rept. no. CU-4-NSF-GP-1904-M
Grant NSF GP1904

Unclassified report

Descriptors: (*Integration, Groups(Mathematics)), (*Groups(Mathematics), Topology), Differential geometry, Mapping(Transformations), Invariance, Tensor analysis, Differential equations.

One of the main problems of local differential geometry is to determine when a given differentiable structure (for example, a Riemannian structure, a projective structure or an almost complex structure) is integrable. The problem of finding a consistent system of differential equations whose unknowns yield a solution to the problem is considered. Only G-structures are studied, though most of the results of this paper can be extended to more general kinds of pseudo-group structures (such as projective structures).

PB-168 132 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Columbia Univ., New York. Dept. of Mathematics.
GROUPS AND PSEUDOGROUPS ACTING ON S1 AND R1,
by Richard Sacksteder. 1964, 18p
Rept. no. CU-9-NSF-GP-1904-M
Grant NSF GP1904

Unclassified report

Descriptors: (*Groups(Mathematics), Mapping-(Transformations)), (*Differential equations, Algebraic topology), Measure theory.

An exposition of some of the classical theorems about groups of homeomorphisms of the 1-sphere S1 has been given by Van Kampen. The main motivation for these investigations has been to analyze the possible global behavior of trajectories of differential equations on 2-manifolds. The investigation of analogous questions for foliations of co-dimension 1 of manifolds of arbitrary dimensions greater than two was. This leads to certain questions about the possible actions of groups and pseudogroups on S1 and R, which are more general than those discussed by Van Kampen and Schwartz, because one can no longer assume that the groups or pseudogroups are generated by a single element. Some more general theorems are given that are needed for applications to the study of foliations.

PB-168 133 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Columbia Univ., New York. Dept. of Mathematics.
THE FULL IMBEDDING THEOREM,
by Barry Mitchell. 1964, 35p
Rept. no. CU-11-NSF-GP 1904
Grant NSF GP1904

Unclassified report

Descriptors: (*Algebra, Mapping(Transformations)), (*Mapping(Transformations), Groups(Mathematics)), Rings, Algebraic topology.

The group valued imbedding theorem asserts that every small abelian category admits an exact, covariant imbedding into the category of abelian groups. From this it follows that a statement concerning exactness and commutativity of a diagram in a general abelian category is true providing that it is true in the category of abelian groups. However, the non-fullness of the imbedding prevents one from handling statements which concern the existence of morphisms in a diagram. It is proved that every small abelian category admits a full, exact, covariant imbedding into a category of R-modules for some ring R.

PB-168 134 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Columbia Univ., New York. Dept. of Mathematics
FROM THE CLASSICAL THEORY OF JACOBIAN VARIETIES,
by Henrik Martens. 1964, 30p
Rept. no. CU-10-NSF-GP-1904-M
Grant NSF GP1904

Unclassified report

Descriptors: (*Complex variables, Functional analysis), Matrix algebra, Mapping(Transformations).

Some of the basic results obtained by Riemann on the relation between a closed Riemann surface and its associated thetafunctions are described. Applications of these results, including a generalization of Torelli's theorem are included.

PB-168 135 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Case Inst. of Tech., Cleveland, Ohio.
NORMAL APPROXIMATIONS TO THE CLASSICAL DISCRETE DISTRIBUTIONS,
by Zakkula Govindarajula. Jul 63, 48p
Rept. no. 107
Grant NSF GP569

Unclassified report

Prepared for presentation at the International Symposium on the Classical and Contagious Discrete Distributions; McGill Univ., Montreal, 15-20 Aug 63.

Descriptors: (*Distribution theory, Numerical methods + procedures), Statistical distributions, Probability, Sequences.

Uniform normal approximations to the classical discrete probability functions and cumulative distribution functions are obtained. Most of the general results on limit theorems scattered in the literature, which are not as familiar to a statistician as they are to a probabilist, are listed. Normal approximations to the binomial, Poisson, negative binomial, hypergeometric, Poisson binomial and the Poisson geometric distributions, where the distribution of a sum of independent and non-identically distributed geometric random variables will be called a Poisson geometric distribution, are studied. For each distribution, various known normal approximations are presented and wherever possible, they are supplemented with new ones. Since the preference of a certain form of approximation over the others is usually dictated by the problem, the preference is left to the discretion of the user. No numerical study of the various approximations is made. It is felt that an Esseen-type of normal approximation for a sum of independent and non-identically distributed lattice random variables is very desirable in order to provide refined uniform normal approximations to the Poisson binomial and the Poisson geometric distributions. (Author)

PB-168 147 Field 12B
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
DECISION PROCESSES AND FUNCTIONAL EQUATIONS,
by S. Karlin and Harold N. Shapiro. 3 Sep 52, 14p
Research memo. no. RM-933
ATI 210 473
Unclassified report

Rept. on Proj. RAND.

Descriptors: (*Dynamic programming, Theory), (*Decision theory, Equations), Topology, Functional analysis, Military strategy, Inventory analysis, Optimization.

This paper considers in an abstract manner the general question of existence and uniqueness of solutions of problems in dynamic programming. (Author)

13. Mechanical, Industrial, Civil, and Marine Engineering

AD-406 833 Field 13H, 11F, 11D
CFSTI Price: HC$1.00

General Electric Co., Philadelphia, Pa. Missile and Space Div.
INVESTIGATION OF BONDING IN OXIDE-FIBER (WHISKER) REINFORCED METALS.
Quarterly technical rept. no. 2, 1 Oct-31 Dec 62,
by Willard H. Sutton. Jan 63, 18p
Contract DA36 034ORD3768, Proj. 59332008
AMRA CR-63-01/2
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Composite materials, Bonding), (*Single crystals, Reinforcing materials), (*Fiber metallurgy, Composite materials), Fibers, Oxides, Aluminum compounds, Nickel, High-temperature research, Coatings, Test methods, Test equipment, Controlled atmospheres, Surface properties.

The reinforcement of metals by ultra high strength single crystal fibers offers a new means to greatly improve their strength over wide temperature ranges. One of the major problems to be solved is the attainment of high strength interfacial bonds between the whiskers and metal matrix. The purpose of this program, therefore, is to investigate the factors affecting the interfacial bonding which will lead ultimately to the development of high strength composites. This report discusses some preliminary studies on interactions between Ni and alpha Al2O3 at elevated temperatures. A sessile drop apparatus was completed and is currently being calibrated for studies on wetting (contact angle) and interfacial energies. The effects of various constituents added to pure Ni and of various coatings on alpha - Al2O3 on both the wetting and bond strength will be evaluated.

AD-433 518 Field 13A, 11D
CFSTI Prices: HC$1.00

Naval Applied Science Lab., Brooklyn, N. Y.
QUALITY CONTROL AND INSPECTION OF GLASS REINFORCED FILAMENT WOUND EPOXY STRUCTURAL PLASTICS FOR DEEP SUBMERGENCE AND OTHER HIGH STRENGTH APPLICATIONS.
Technical memo. no. 1, Unclassified report
by W. Hand. 27 Mar 64, 16p
Proj. SR007 03 04, Task 1008
NASL 6188 TM1

Available copy will not permit fully legible reproduction.

Descriptors: (*Filament wound construction, Non-destructive testing), (*Ultrasonic radiation, Non-destructive testing), Quality control, Epoxy plastics, Glass textiles, Panels(Structural), Attenuation, Shear stresses, Compressive properties, Absorption, Submarine hulls, Composite materials, Mathematical analysis, Reinforcing materials.

An ultrasonic attenuation method was developed to non-destructively determine void content in orthogonal filament wound panels. Attenuation was correlated with physical properties to establish quality control criteria. Mathematical relationships between attenuation, interlaminar shear strength and void content were determined. (Author)

N65-19874 Field 13H, 22A
CFSTI Prices: HC$2.00 MF$0.50

Aerojet-General Corp., Azusa, Calif.
RESEARCH ON PROCESSES FOR UTILIZATION OF LUNAR RESOURCES.
Quarterly rept.,
by S. D. Rosenberg, G. A. Guter, F. E. Miller, and R. L. Beegle. Jan 65, 50p Rept. no. 0765-03-2
Contract NAS7 225
NASA CR-57484
Unclassified report

Descriptors: (*Silicates, Reduction(Chemistry)), (*Moon, Economic geology).

N65-23255 Field 13K, 10B, 22B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ANALYSIS OF LINEAR-INDUCTION OR TRAVELING-WAVE ELECTROMAGNETIC PUMP OF ANNULAR DESIGN,
by Richard E. Schwirian. May 65, 34p NASA-TN-D-2816
Unclassified report

Descriptors: (*Electromagnetic pumps, Rings), (*Coolant pumps, Electric power production), Induction systems, Spacecraft.

N65-24380 Field 13A, 20M, 22B
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ANALYSIS AND EVALUATION OF A VAPOR-CHAMBER FIN-TUBE RADIATOR FOR HIGH-POWER RANKINE CYCLES,
by Henry C. Haller, Seymour Lieblein, and Bruce G. Lindow. May 65, 60p NASA-TN-D-2836
Unclassified report

Descriptors: (*Rankine cycle, Radiators), (*Radiators, Electric power production), Spacecraft, Heat exchangers.

N65-24775 Field 13H, 11F
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.

EXPLORATORY STUDY OF BEND DUCTILITY OF SELECTED REFRACTORY METAL WELDMENTS,
by John H. Sinclair. Jun 65, 27p NASA-TN-D-2865
Unclassified report

Descriptors: (*Refractory metal alloys, Welds), (*Welds, Ductility).

Patent 3,190,299 Field 13M

AIR-SUPPORTED BUILDING STRUCTURE.
Patent assigned to Army,
by Allen M. Moody. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Inflatable structures, Buildings), (*Buildings, Inflatable structures), Flexible structures, Prefabricated buildings, Pneumatic devices, Patents.

The building structure is strikable instantaneously and is readily reassembled and erected. It is formed of two flexible sections joined by separable fasteners along the ridge line of the structure, each of the flexible sections being formed of a lower side wall and an upper panel that are releasably connected on a line spaced from the ridge line of the structure.

Patent 3,190,416 Field 13I, 20F, 1C

CLUTCH AND BRAKE POSITIONING DEVICE.
Patent assigned to Army,
by James E. Harter. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Reticles, Positioning devices(Machinery)), (*Positioning devices(Machinery), Reticles), Brakes, Clutches, Control knobs, Patents, Human engineering.

The clutch and brake positioning device is utilized to position a reticle assembly. The coordinate positioning device is operated with a facility not previously realized in the operation of such devices. The brake lever is so related to the control knob that it can be operated by the fingers without release of the hand from the control knob.

Patent 3,190,460 Field 13D, 13F

AIRBORNE CARGO-HANDLING AND TIE-DOWN SYSTEM.
Patent assigned to Navy,
by Norman N. Rubin. 22 Jun 65 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Cargo, Handling), (*Fastenings, Cargo), Bags(Containers), Patents, Vacuum, Plastics, Force-(Mechanics), Loading(Mechanics), Transport planes, Adhesion, Cargo vehicles, Railroad cars, Airborne.

The cargo-handling and tie-down system is described for use in the cabin of a cargo-carrying aircraft but can be used in railroad freight car or road vehicle. Cargo is 'tied-down' by the combination of forces of the enshrouding action of a plastic envelope, of a suction/air pressure pushing the load down on the floor, and the molecular adhesion of the plastic envelope and the material of the load-bearing unit.

Patent 3,191,048 Field 13L, 17H, 20F

LIGHT SENSITIVE ALARM SYSTEM.
Patent assigned to AEC,
by Richard G. Cowen. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Warning systems, Photoelectric materials), (*Photoelectric materials, Warning systems), Resistors, Coupling circuits, Light, Photoelectric cells(Semiconductor), Patents.

The system is used to detect the presence of an intruder in a room and to activate an alarm. The system includes a single light source positioned in the ceiling, a plurality of photoresistors positioned throughout the room and a bridge circuit connected to the photoresistors. An alarm relay is connected across the bridge.

Patent 3,191,962 Field 13F, 19C

ARTICULATING HEAVY EQUIPMENT TRANSPORTER.
Patent assigned to Army,
by John E. Coordes. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Trailers, Design), (*Tracked vehicles, Trailers), (*Tanks(Combat vehicles), Trailers), Patents, Tires, Couplings, Loading(Mechanics), Axle shafts.

The trailer is designed to carry a tracked vehicle or military tank. The vertical articulated trailing unit bed has two chassis parts joined by a hinged coupling for the pivotal movement of one chassis part with respect to the other about a horizontally disposed axis to insure constant ground clearance. The trailer main frame members are utilized as the loading platform for the vehicle to be transported. The axles are located inboard of the frame members and the entire unit is unsprung with the exception of that provided by the low pressure tires.

PB-167 990 Field 13J
CFSTI Prices: HC$3.00 MF$0.75

Booz-Allen Applied Research, Inc., Bethesda, Md.
THE SURFACE EFFECT SHIP IN THE AMERICAN MERCHANT MARINE. PART IV. A COMPARATIVE STUDY OF THE ECONOMIC FEASIBILITY OF TWO SIDEWALL CONCEPTS WITH OTHER SURFACE EFFECT SHIPS.
Final rept.
Mar 65, 69p Unclassified report
Contract MA3742
Continuation of Contract MA3232.

Descriptors: (*Merchant vessels, Planning surfaces), (*Ship hulls, Feasibility studies), (*Planning surfaces, Airborne), Performance(Engineering), Design, Costs, Ships(Nonmilitary), Power, Economics.

Two crafts of the 'sidewall' type are examined: the air-lubricated hull and the captured air bubble. The major advantages claimed for these two concepts are reduced air leakage and lower power requirements. Both crafts are capable of being built in extremely large sizes. It was concluded that the captured air bubble offered the greatest potential to the American Merchant Marine.

PB-168 070 Field 13B
CFSTI Prices: HC$5.00 MF$1.00

Office of Science and Technology, Washington, D. C.
TECHNOLOGY AND URBAN TRANSPORTATION,
by John R. Meyer, John F. Kain, and Martin Wohl.
Jun 62, 161p
Unclassified report

Descriptors: (*Urban areas, Transportation), (*Transportation, Urban areas), Urban planning, Population, Railroads, Roads, Passenger vehicles, Costs, Statistical analysis, Tables, United States.

The analysis and evaluation of technology and urban transportation was conducted for the purpose of identifying useful technological research areas. By way of accomplishing this objective, some limited system design and analysis was performed and alternative transport modes were compared. The necessity of comprehensive system-wide analysis is emphasized in order to project the value and viability of particular transport modes or combinations thereof in specific metropolitan areas. The report, however, does not provide such analysis and no inference should be drawn from it regarding the feasibility of specific transport systems.

PB-168 117 Field 13C
CFSTI Prices: HC$1.00 MF$0.50

West Virginia Univ., Morgantown. Coal Research Bureau.
A NEW APPROACH TO THE PRODUCTION OF FLYASH-BASED STRUCTURAL MATERIALS.
Coal research development rept.,
by C. F. Cockrell and H. E. Shafer, Jr. 1965, 16p
Contract 14 01 0001 269 Unclassified report
OCR RDR-8
An excerpt from Part 7 of Coal-Associated Minerals of the United States.

Descriptors: (*Combustion products, Coal), (*Materials, Construction), (*Brick, Combustion products), Structures, Production, Tests, Costs, Feasibility studies, Transportation, Specifications, Tensile properties, Sand, Sodium compounds, Silicates.

Study of test results shows that the fired flyash-based test specimens compare well with ASTM specifications for clay brick. The probable cost of flyash-based structural material is attractive in that raw material cost is low and long distance transportation would not normally be involved. Within the scope of the present work, no definite conclusions can be drawn concerning the relationship existing between the effect of water addition, mixing time, and drying rate on brick quality. (Author)

PB-168 171 Field 13F, 6P, 6S
CFSTI Prices: HC$3.00 MF$0.75

United Aircraft Corp., East Hartford, Conn. Research Labs.
LITERATURE SURVEY OF PASSENGER COMFORT LIMITATIONS OF HIGH-SPEED GROUND TRANSPORTS,
by J. P. Carstens and D. Kresge. 26 Jul 65, 60p
Rept. no. D-910353-1 Unclassified report

Research supported by Department of Commerce, Washington, D. C.

Descriptors: (*Transportation, Tolerances(Physiology)), Passenger vehicles, Railroads, Air transportation, Acceleration, Vibration, Pressure, Noise, Vision, Thresholds(Physiology), Reaction(Psychology), Stress(Physiology), Reviews, Graphics, Tables.

A literature survey was made of passenger comfort criteria applicable to high-speed ground transports. Factors considered include acceleration vibration, pressure changes, atmospheric contamination, visual disturbances, and noise. Literature examined includes engineering data pertinent to the analysis of riding comfort in trains, automobiles, and airplanes, as well as aerospace medical and other medical sources. The results of the survey are presented in figures and tables. A summary of recommended values of the pertinent variables is also provided. (Author)

14. Methods and Equipment

Cape-1124 Field 14B, 20B

Brookhaven National Lab., Upton, N. Y.
CIRCULAR PHI-CHI MOTION DEVICE.
Engineering materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Goniometers, Crystal structure), (*Crystal structure, Goniometers), Mechanical drawings, Motion, Measurement.

(35 drawing) A goniostat used in determining crystal structure to obtain three-dimensional intensity data by x-ray or neutron diffraction is described. The device has 360 degree phi motion, 360 degree chi motion, an accuracy of setting these two angles to a hundredth of a degree, digitizer coupling and readout for each angle, ability to automatically program the angle settings, and minimum blanked out areas. The instrument consists of a ring with both phi-chi motion. A goniometer is mounted in the ring. A limited omega manual adjustment is incorporated in the base of the goniostat. This movement is indexed to 0.01 degree intervals over a 10 degree range and is intended for alignment. (AEC abstract)

CAPE-1159 Field 14B

Oak Ridge National Lab., Tenn.
ELECTRONIC TIMER /Q-2706/.
Engineering materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Timing devices, Mechanical drawings), (*Electronic equipment, Timing devices), Digital systems, Clocks, Time interval counters.

(1 drawing) An inexpensive timer with digital accuracy is described, which replaces bulky, motor-driven timers of limited accuracy. It is used in any application to 'start' and 'stop' an operation after any time interval and is adjustable in 1-sec increments from 1 to 9999 sec. The variation in time interval is less than 5 msec at any setting. The output from the timer is in the form of an electrical pulse, occurring at the start and the end of the selected time interval. The timer uses a 10-cps mechanical oscillator as the clock and a four digit pre-set, count-down register. The desired time interval is dialed by the operation of the thumbwheels of the count-down register. Upon activation of a start pushbutton, the countdown proceeds until the register indicates 0000. Then, the register must be reset electrically with another push-button prior to another timing operation. A Q-880-79 power supply controls the flip-flop for the register drive. (AEC abstract)

CAPE-1163 Field 14B, 13H

Du Pont de Nemours (E. I.) and Co., Inc., Aiken, S. C. Savannah River Lab.
METALLOGRAPHY PREPARATION FACILITY, HIGH LEVEL CAVES, CELLS 7 AND 8.
Engineering materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Metallography, Industrial plants), (*Test facilities, Metallography), Mechanical drawings.

(68 drawings) The remote metallography preparation facility, located in the high-level caves in 1958, was enlarged in 1960 and again in 1962. Cells 7 and 8, and other cells are 6 ft x 6 ft and are equipped with Model 8 master-slave manipulators and an electro-mechanical heavy duty manipulator. The polishing cell contains 5 vibratory polishers and an ultrasonic cleaning station. The mounting and grinding cell contains an ultrasonic cleaner, mechanical grinders, and vacuum impregnating equipment. (AEC abstract)

CAPE-1196 Field 14B

Oak Ridge National Lab., Tenn.
HIGH-SENSITIVITY COULOMETRIC TITRATOR /Q-2564/.
Engineering materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Laboratory equipment, Volumetric analysis), (*Volumetric analysis, Laboratory equipment), Mechanical drawings, Specifications, Amplifiers.

(24 drawings, 13 specifications) A coulometric titrator designed and constructed for the accurate determination of small amounts (0.007 microeq to 100 microeq) of high-equivalent weight materials such as Pu(4+) + e(-) = Pu(3+), where one Faraday is equivalent to 239 g of metal, is described. For the titration of 4 microeq of material, or more, the accuracy and precision are comparable to that obtained with Model Q-2005. The performance of this instrument is better than older models for titrations of 0.01 to 4 microeq. The design is based upon three operations amplifiers: the first controls the potential difference between a working (controlled) electrode and a reference electrode; the second furnishes and measures the current flowing through the cell; and the third integrates a known portion of the cell current as a function of time. The ouput of the last circuit is used as a readout in determining the amount of material oxidized or reduced at the controlled electrode. Readout can be indicated on a chart, XY recorder, or potentiometer. It can be operated as above or by a simple front-panel switching operation and may be used for bench-top or hot-cell operation. (AEC abstract)

Patent 3,190,110 Field 14B

MECHANICAL SPIKE PULSE FILTER FOR SHOCK MACHINE.
Patent assigned to Navy,
by Lester V. Craycraft. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Impact shock, Vibration isolators), (*Vibration isolators, Drop testing), (*Drop testing, Vibration isolators), Shock(Mechanics), Patents, Acceleration, Metal plates, Steel, Lead, Pellets, Shock waves, Test equipment.

The effects of 'spike' accelerations on a specimen are eliminated by providing an isolator attached to the carriage of a drop tower. A plate, to which the specimen is attached, and the isolator are carried on the carriage of a typical drop tower such that the isolator filters most of the 'spikes' from the adapter plate. The rise time of the pulse can be controlled by providing a tapered steel pin beneath the carriage which strikes and penetrates a lead pellet placed on an anvil.

Patent 3,191,028 Field 14B

SCANNING ELECTRON MICROSCOPE.
Patent assigned to AEC,
by Albert V. Crewe. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Electron microscopes, Patents).

The electron microscope utilizes only a single lens system. The system includes a point source of monoenergetic electrons with an arrangement for focusing the electrons into a spot on a specimen, a raster type scanner, a momentum analyzer, a scintillation detector, and a cathode ray tube.

PB-168 149 Field 14B
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
TEMPERATURE POTENTIOMETER MODEL 8693 (LEEDS AND NORTHRUP).
Technical manual instrument calibration procedure, ST-09.
15 Mar 65, 9p NAVWEPS-17-20ST-09
Unclassified report

Descriptors: (*Temperature sensitive elements, Potentiometers), (*Potentiometers, Calibration), Instruction manuals, Test methods.

The manual describes the calibration procedure for the Leeds and Northrup 8693 temperature potentiometer.

PB-168 161 Field 14B
CFSTI Prices: HC$2.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
ML-04 MICROPTIC THEODOLITE MK 2 (HILGER AND WATTS).
Instrument calibration procedure technical manual.
15 Mar 65, 34p NAVWEPS 17-20ML-04
Unclassified report

Descriptors: (*Theodolites, Calibration), Telescopes, Aligment, Instruction manuals, Test methods.

The Hilger and Watts Mk 2 microptic theodolite consists primarily of a telescope pivoted on a horizontal axis supported by a standard that can be rotated about a vertical axis. It is provided with levels and adjustment screws for precise sighting of the telescope, with graduated horizontal and vertical circles for measuring the sighting direction, and with an autocollimating eyepiece so that measurements can be made in the line of sight or autocollimation mode. The manual contains the procedure for calibrating the test instrument.

PB-168 162 Field 14B
CFSTI Prices: HC$2.00 MF$0.50

Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
ST-08 PORTABLE TEMPERATURE BRIDGE GRAY E1007.
Instrument calibration procedure technical manual.
1 Apr 65, 28p
NAVWEPS 17-20ST-08

Unclassified report

Descriptors: (*Temperature sensitive elements, Portable), (*Instrumentation, Calibration), Instruction manual, Test methods, Temperature, Measurement.

The manual describes the calibration procedure for the Gray E-1007 portable temperature bridge.

15. Military Sciences

AD-428 705 Field 15C, 5D
CFSTI Prices: HC$3.00

Hudson Inst., Inc., Harmon-on-Hudson, N. Y.
ARMS CONTROL AND CIVIL DEFENSE,
ed. by D. G. Brennan. 2 Dec 63, 53p
Rept. no. HI-216-RR
Contract ACDA IR10

Unclassified report

Descriptors: (*Civil defense systems, Arms control), (*Arms control, Civil defense systems), (*Disarmament, Civil defense systems), Shelters, Deterrence, Military strategy, Foreign policy, Cold war, Psychological warfare, Public opinion, Vulnerability, Casualties, Nuclear weapons, Research program administration.

Contents: Methodology and overview, Alternative strategic settings, The strategic impact of civil defense on arms control, A theory of arms control tendencies, Social, psychological, and political effects of CD, Impact of arms control and the arms race on civil defense, Civil defense as arms control, Some special problems of NATO.

AD-429 787 Field 15C, 5D
CFSTI Prices: HC$3.00

Hudson Inst., Inc., Harmon-on-Hudson, N. Y.
ARMS CONTROL AND CIVIL DEFENSE. ANNEX II. CIVIL DEFENSE AND CONTROL OBJECTIVES,
by Raymond D. Gastil. 20 Aug 63, 69p
Rept. no. HI-216-RR/II
Contract ACDA/IR10

Unclassified report

Descriptors: (*Arms control, Civil defense systems), (*Civil defense systems, Arms control), (*Disarmament, Civil defense systems), Nuclear warfare, Limited war, Armed forces budgets, Military strategy, Federal budgets, Foreign policy, Cold war.

Civil defense programs as alternatives in arms-control-tending strategies which involve more than arms control considerations thus look much more desirable than when viewed as isolated factors in the arms control environment or in terms of their strategic roles as more or less isolated items. Aside from their positive virtues, civil defense programs are often the lesser evil, when evils are not avoidable. In addition, this section has also suggested that civil defense programs are tools with which to solve problems of our national defenses (which include the protection of people and the prevention of war). As a tool a program may be more or less expensive to buy, more or less dangerous to use, and more or less effective. The strategist who strives for a general security policy emphasizing arms control as an important objective needs to know which tools are available, what their characteristics are, and what problems he may have to meet out of his kit. Thus, he should wish to avoid the easy labeling of items as unimportant, unlikely, or arms-race-tending for fear that situation-bound prejudices may limit rationality in unknown and unknowable futures. His training should rather be in the field of characteristics of the possibilities which the world may afford and of the tendencies which should in the last analysis be supported. In this sense, then, these conclusions to Part III of our analysis must be the conclusions to the whole.

16. Missile Technology

No entries

17. Navigation, Communications, Detection, and Countermeasures

N65-24378 Field 17G, 22A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
INVESTIGATION OF A MANUAL SEXTANT-SIGHTING TASK IN THE AMES MIDCOURSE NAVIGATION AND GUIDANCE SIMULATOR,
by Bedford A. Lampkin and Robert J. Randle. May 65, 37p NASA-TN-D-2844

Unclassified report

Descriptors: (*Space navigation, Training devices), (*Sextants, Space navigation).

N65-24382 Field 17G, 22A
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
SECOND-ORDER PERTURBATION ANGLE TECHNIQUES FOR ACCURATELY SIMULATING SIGHTING PROBLEMS OF A SPACE SEXTANT,
by Richard L. Kurkowski and Kenneth C. Grover.
May 65, 63p NASA-TN-D-2843

Unclassified report

Descriptors: (*Sextants, Space navigation), (*Space navigation, Simulation).

N65-24563 Field 17G, 22A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration,

Moffett Field, Calif. Ames Research Center.
THE EVALUATION OF TWO METHODS OF SURVEYING STAR BACKGROUNDS FOR SPACE MISSION SIMULATORS,
by Burnett L. Gadeberg. Jun 65, 30p NASA-TN-D-2856
Unclassified report

Descriptors: (*Space navigation, Training devices), (*Surveying, Space navigation).

Patent 3,190,958 Field 17B, 9C

FREQUENCY-SHIFT-KEYED SIGNAL GENERATOR WITH PHASE MISMATCH PREVENTION MEANS.
Patent assigned to Army,
by Edward C. Bullwinkel, Elis D. Hanson, and Robert E. Webb. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Signal generators, Frequency shift keyers), (*Telegraph signals, Signal generators), Telegraph equipment, Circuits, Phase control devices, Patents.

Circuitry is provided for generating frequency shift keyed signals of the cosine type. The generator provides FSK Cosine telegraph signals and automatically corrects for phase mismatch in the output signal.

Patent 3,191,086 Field 17B, 9A

SECONDARY EMISSION MULTIPLIER INTENSIFIER IMAGE ORTHICON.
Patent assigned to Air Force,
by Radames K. H. Gebel. 22 Jun 65 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Image orthicons, Image intensifiers(Electronics)), (*Image intensifiers(Electronics), Secondary emission), Image tubes, Electron multipliers, Patents.

The image orthicon tube, when used in conjunction with a suitable optical system, can perceive scenes at light levels far below the level possible with the unaided eye. The tube has a low noise image amplifier between the photocathode and the target.

Patent 3,192,525 Field 17C, 9C

RESISTIVE PHASE COMPENSATOR.
Patent assigned to Navy,
by Layton D. Morgan and Robert D. Strait. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Phase control devices, Resistors), (*Direction finding, Phase control devices), Phased arrays, Phase shifters, Microminiaturization(Electronics), Patents.

The multi-beam-steering network may be produced at low cost and is easy to maintain and repair in operational use. It is compatible with transistor beam signal amplifiers, with a beam forming capability which is unaffected by the load resistance that is usually the input resistance of the beam signal amplifier. Microminiature parts are used.

Patent 3,192,526 Field 17C, 9F

WAVE-SIGNAL DIRECTION-DETECTING APPARATUS.
Patent assigned to Navy,
by Verne E. Hildebrand. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Direction finding, Radio receivers), (*Radio receivers, Very low frequency), Loop antennas, Phototubes, Gates(Circuits), Cathode ray tubes, Patents.

The wave-signal direction-detecting apparatus can receive signals arriving from all directions, but visibly displays signals received from only one direction. The system includes an antenna arrangement which includes a pair of loop antennas in quadrature and a sense antenna, a cathode ray tube, a mask, and a photoelectric cell associated with a gate connected to a second receiving antenna.

PB-168 082 Field 17B, 9A
CFSTI Prices: HC$4.00 MF$1.00

LTV Military Electronics Div., Dallas, Tex.
STABILIZED MASTER OSCILLATOOR,
by G. D. Bassham. Dec 64, 142p
Contract FA WA4259, Proj. 221 110 08C
SRDS RD-64-155
Unclassified report

Descriptors: (*Radiofrequency oscillators, Digital systems), (*Radio equipment, Stabilization), Very high frequency, Ultrahigh frequency, Radio transmitters, Semiconductor devices, Modules(Electronic), Radio communication systems, Radiofrequency filters, Switching circuits, Performance(Engineering), Radio receivers.

An investigation was made to develop and fabricate two engineering models of a digitally stabilized master oscillator system. The equipment was designed to meet the specifications for Project 113-19 issued by the Communications Branch, Development Division of the Systems Research and Development Service for the Federal Aviation Agency. The equipment produced incorporates LTV's Digital-Stable-Master-Oscillator (DIGISMO) concept to provide a highly stable basic frequency source with ten individual frequency selected outputs. The system uses solid state devices throughout, and modular construction techniques were employed to assure a flexible and easily maintained system. Each system consists of a reference unit and two units containing five slave oscillators each. (Author)

PB-168 108 Field 17G, 9B
CFSTI Prices: HC$5.00 MF$1.00

Lear Siegler, Inc., Grand Rapids, Mich. Instrument Div.
HYPERBOLIC COORDINATE CONVERTER.
Final rept.,
by W. F. Roth, A. R. VanKoevering, and D. Wozniak.
Jan 65, 173p Pub. no. GRR-65-1023
Contract FA WA4659, Proj. 116 8
SRDS RD-65-3
Unclassified report

Descriptors: (*Hyperbolic navigation, Navigation computers), (*Navigation computers, Hyperbolic navigation), (*Digital computers, Navigation computers), (*Loran equipment, Navigation computers), Airborne, Flight testing, Radio navigation, Radio receivers, Trigonometry, Errors, Equations.

The Loran-C hyperbolic navigation system has not been utilized in aircraft navigation applications because of the problems involved in relating the putputs of the radio receiver (time differences) into useful information for the pilot or navigator. These problems were solved by the development of a Hyperbolic Coordinate Converter which converts the time difference outputs of the radio receiver into the conventional latitude-longitude coordinates; and from the present position coordinates, calculates and displays the distance, bearing, and bearing error to a preselected destination along a preselected course. The mechanization of the computer was a major breakthrough in digital computers and is now called DIVIC for DIgital Variable Increment Computer. This technique is completely outlined with a description of the resulting hardware. (Author)

18. Nuclear Science and Technology

AD-444 787 Field 18D, 18K
CFSTI Price: HC$2.00

Harry Diamond Labs., Washington, D. C.
NEUTRON AND GAMMA MEASUREMENTS. MARK I AND MARK F TRIGA REACTORS,
by Philip G. Berman. 30 Apr 63, 40p Rept. no. TR-1104 Proj. 29020 Unclassified report

Descriptors: (*Neutrons, Measurement), (*Gamma rays, Measurement), (*Radiation damage, Electronic equipment), Light water reactors, Neutron flux, Neutron counters, Gamma counters, Reactor hazards, Reactor fuel elements, Control rods, Dose rate, Neutron spectrum.

Integrated neutron-flux (fluence) and neutron-spectrum data have been obtained on the General Atomic Mark I and Mark F reactors. Limited gamma-ray dose data have also been obtained. The data are presented graphically to facilitate determination of the radiation enviroment provided at the various test positions in the above reactors. Gamma-ray doses were as high as 145,000 r/pulse; and neutron fluence above sulphur threshold (3 mev) were greater than 10 to the 14th power n/cm sq. (Author)

CAPE-917 Field 18D

Oak Ridge National Lab., Tenn.
AUTOMATIC ABSORPTION COUNTER /Q-1314/.
Engineering materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Gamma counters, Mechanical drawings), (*Beta decay, Mechanical drawings), (*Radiochemistry, Counting methods), Automatic.

(13 drawings) An absorption counter used in radiochemistry to obtain the K curves of mixed beta emitters and for gamma counting is described. It is reliable and counts on a given cycle. A G-M tube and a 64 Scaler are used with the counter. The counter housing is shielded by 0.25 in. of lead. The absorption curves are used to determine what is decaying. The absorber is fabricated of Al. (AEC abstract)

CAPE-1084 Field 18I, 18F

Oak Ridge National Lab., Tenn.
SEGMENTING CELLS FOR THE BSR/ELECTRICAL DRAWINGS.
Engineering materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Nuclear reactors, Wiring diagrams), Mechanical drawings, Shielding.

(12 drawings) Electrical drawings for the Bulk Shielding Reactor (BSR) segmenting cells are presented. The segmenting facility consists of a tunnel, discharging and charging rooms, change rooms, two small cells, and one large cell containing three windows. (AEC abstract)

CAPE-1171 Field 18F

Oak Ridge National Lab., Tenn.
SHIELDED ALPHA FACILITY.
Engineering materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Alpha particles, Shielding), Mechanical drawings, Handling, Reactor materials.

(65 drawings) The facility described is used for handling alpha-emitting materials in the transuranium program. The 1-ft 6-in. thick shield of lead bricks encloses an area 10 ft 4 in. high, 10 ft wide, and 10 ft deep. At the side of the facility is a glove box 36 in. long, 30.5 in. high, with the top 17 in. deep, and the bottom 27 in. deep. Within the enclosure is a disposable glove box, which is constructed of structural steel. The plexiglas window is 60 in. wide, 64 in. high, and 54 in. deep. A remote bag-out mechanism provides a means for removing alpha contaminated materials from within the shielded alpha-tight enclosure. Materials to be removed are bagged and inserted into a magnetic container. The container is placed into the bag-out port and removed through the shield wall directly into a shielded waste cask. The lead filled, stainless steel cask is 17 in. OD and 8 in. ID. A sealing tool is used to quickly and efficiently seal polyethylene bags without spreading the bag out flat. The bag is gathered into a cylindrical shape and heat sealed using a standard soldering iron in which the tip has been replaced by a Cu blade with a knife edge. A plastic bag seal can be used effectively and simply combine and separate individual alpha-tight enclosures without breaking the seal. (AEC abstract)

N65-24561 Field 18N, 10C
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EXPERIMENTAL PRESSURE-DROP INVESTIGATION OF NONWETTING CONDENSING FLOW OF MERCURY VAPOR IN A CONSTANT-DIAMETER TUBE IN 1-G AND ZERO-GRAVITY ENVIRONMENTS,
by James A. Albers and Robert P. Macosko. Jun 65, 32p NASA-TN-D-2838
Unclassified report

Descriptors: (*Power supplies, Weightlessness), (*Liquid metal coolants, Mercury).

Patent 3,190,804 Field 18H, 18G

METHOD FOR PRODUCING, SEPARATING, AND PURIFYING PLUTONIUM.
Patent assigned to AEC,
by Glenn T. Seaborg, Joseph W. Kennedy, and Arthur C. Wahl. 22 Jun 65 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Plutonium, Production), (*Beta decay, Neptunium), (*Deuteron bombardment, Uranium), Purification, Separation, Radioactive decay, Isotope separation, Patents.

Plutonium is produced by subjecting a mixture of U235 and a fissionable isotope to a self-sustaining neutronic chain reaction, aging the reacted material, and separating plutonium from the aged reacted material.

Patent 3,191,662 Field 18G, 7A

CONTINUOUS SOLUTION CONCENTRATOR.
Patent assigned to AEC,
by Kenneth J. Schneider. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Radioactive wastes, Processing), Solutions, Density, Heating, Condensers(Liquefiers), Reactor fuel processing, Patents.

The concentrator is for concentrating aqueous radioactive waste solutions from nuclear reactor fuel reprocessing. A structure is disclosed which, while keeping the walls cool with which the solution comes in contact, concentrates the solution by heating the atmosphere.

Patent 3,192,069 Field 18N

RADIOACTIVE ISOTOPE POWERED THERMOELECTRIC GENERATOR SYSTEM.
Patent assigned to AEC,
by Joseph H. Vogt, Charles N. Young, and Willard C. Reed. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Thermoelectricity, Stand-by generators), (*Nuclear power plants, Spacecraft), (*Spacecraft, Auxiliary power plants), Radioactive isotopes, Patents.

The generator system is used on a space vehicle to provide an auxiliary power source. The radioactive isotope powered thermoelectric generator system utilizes a thermohydraulic thermal shutter control mechanism. This system converts changes of vehicle hot skin temperature into linear motion which is used to open and close thermal shutters and thereby vary the rate heat containment.

Patent 3,192,122 Field 18J

FUEL ELEMENT FOR A NUCLEAR REACTOR HAVING STACK OF THIN FUEL WAFERS SUBMERGED IN LIQUID METAL.
Patent assigned to AEC,
by Le Roy R. Kelman and Owen L. Kruger. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Reactor fuel elements, Design), (*Liquid metal cooled reactors, Reactor fuel elements), Liquid metals, Patents, Uranium, Uranium alloys, Plutonium, Thermal neutrons, Fission.

The fuel element is for a liquid-metal-cooled nuclear reactor. It is made of a stack of contiguous thin wafers of a material fissionable by neutrons of thermal energy. A metal jacket having a hole in the top surrounds the stack of wafers. The jacket contains a liquid metal bonding agent.

PB-167 634 Field 18H, 9A
CFSTI Prices: HC$1.00 MF$0.50

IBM Space Guidance Center, Owego, N. Y.
STUDY OF EFFECT OF HIGH-INTENSITY PULSED NUCLEAR RADIATION ON ELECTRONIC PARTS AND MATERIALS (SCORRE).
Quarterly progress rept. no. 3, 1 Aug-31 Oct 63. 31 Oct 63, 21p Rept. no. 63-521-25
Contract DA36 039AMC00161E
AD 429 722
Unclassified report

Descriptors: (*Electronic equipment, Radiation damage), (*Radiation damage, Electronic equipment), (*Mica capacitors, Radiation damage), (*Ceramic capacitors, Radiation damage), Capacitance, Voltage, Circuits, Electric currents.

The results of a Sandia Pulsed Reactor Facility experiment on mica capacitors are presented in a form that is directly useable by design engineers. An experiment performed to determine if the capacitance dependence on temperature could tend to cause the observed radiation induced currents is described. In addition, the techniques used to fabricate the experimental capacitors are also discussed. (Author)

PB-167 916 Field 18J, 18L
CFSTI Price: HC$1.00

Commassariat a l'Energie Atomique, Chusclan (France Centre de Production de Plutonium de Marcoule).
RADIO-ACTIVITY MEASUREMENTS INSIDE THE PRESSURE-VESSEL OF THE REACTOR G 3 AFTER 4 YEARS OPERATION (Mesure de Radioactivite a l'Interieur du Caisson de la Pile G.3 Apres 4 ans de Fonctionnement),
by Jean-Philippe Chassany, Pierre Guillermin, and Jean Delmar. Apr 65, 11p Rept. no. CEA-R-2785
Unclassified report

Attached summary in English, text in French.

Descriptors: (*Reactor materials, Radioactivity), (*Reactor inspection, Radiation hazards), Power reactors, Pressure vessels, Reactor system components, France.

At the end of the piping coming into the vessel, the dose rate reached 75 mR/hr and 100 mR/hr near the deflector. On the other side of this deflector it was still 100 mR/hr and then increased rapidly to over 1 R/hr at 1 metre distance from the starting-up chambers. On the sides, the flux tended to decrease (80 mR/hr) and was 2 R/hr at a height of 3 metres. This dose rate could certainly have been decreased by discharging the peripheral zone of the reactor. Consequently it should be possible to intervene if necessary, on condition that great care is taken to avoid contamination and that the total dose is followed as precisely as possible during the operations. (Author)

PB-167 954 Field 18H, 7E, 18B, 18G
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.

MEASUREMENT OF RADIOACTIVE ISOTOPES BY GAMMA AND X RAYS SPECTROMETRY WITH INa CRYSTALS. APPLICATION TO RADIOCHEMISTRY OF SOME FISSION AND ACTIVATION PRODUCTS (Mesures d'Isotopes Radioactifs par Spectrometrie Gamma et X a l'aide de cristaux INa. Application a la Radiochimie de Certains Produits de Fission et d'Activation),
by Pierre Simonet, Ginette Boile, and Genevieve Simonet. Apr 65, 84p CEA-R-2461
Unclassified report

Text in French with attached summary in English. Available copy will not permit fully legible reproduction.

Descriptors: (*Radioactive isotopes, Nuclear spectroscopy), (*Fission products, Radiochemistry), (*Radiochemistry, Fission products), (*X-ray spectroscopy, Radioactive isotopes), (*Gamma-ray spectroscopy, Radioactive isotopes), Radioactive decay, Crystals, Sodium compounds, Iodides, Half life, Decay schemes, Rare earth elements, Gamma-neutron reactions, France.

A method is given for the determination of the number of radioactive atoms in a radiation source. The method was used in connection with the determination of the half life, energy of measured photopeaks, and branching ratio of the following isotopes: Zr95, Nb95, Mo99, Ru103, Ru106, Ag111, Cd115, Cd115m, Te132, Te132m, Cs134, Cs136, Cs137, Ba140, La140, Y91, Ce141, Ce144, Nd147, Eu156, Ag110, Sb154, Np239, U237, Au241.

PB-167 955 Field 18B, 7A
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
FRONTAL AND BAND DISPLACEMENT CHROMATOGRAPHY OF THE HYDROGEN ISOTOPES ON PALLADIUM (Chromatographies Frontale et de Deplacement de Bande des Isotopes de l'Hydrogene sur Palladium),
by Fernande Botter, Janine Menes, Serge Tistchenko, and Gregoire Dirian. May 65, 89p CEA-R-2545
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Hydrogen, Isotope separation), (*Chromatographic analysis, Hydrogen), (*Isotope separation, Hydrogen), Palladium, Mathematical models, Surface properties, Deuterium, Tritium.

The results of theoretical and experimental work on hydrogen isotope separations are given. A simple model was developed and tested involving the case in which the separation coefficient is very different from unity. A description is also given of a new graphical method for deducing the number of theoretical plates in a chromatographic column of the frontal and band displacement types. Experimental findings are given concerning the validity of the model, the law as a function of (alpha) H2-HD temperature, the HETP as a function of various parameters on several Pt supports, and the possibilities of an application to preparative chromatography.

PB-167 965 Field 18F, 18G, 18J
CFSTI Prices: HC$1.00 MF$0.50

Commissariat a l'Energie Atomique, Chusclan (France). Centre de Production de Plutonium de Marcoule.
RADIOPROTECTION AND THE ARGON 41 FORMED IN THE REACTORS G 1 AND G 2/G 3 (La Radioprotection et l'Argon 41 Forme dans les Piles G 1 et G 2/G 3),
by Jean-Phillippe Chassany, Robert Paillard, and Pierre Meffre. Apr 65, 19p
Rept. no. CEA-R-2764 Unclassified report

Text in French, Attached summary in English. Available copy will not permit fully legible reproduction.

Descriptors: (*Reactor coolants, Radiological contamination), (*Radiological contamination, Argon), (*Argon, Radioactive isotopes), Exhaust gases, Air, Carbon dioxide, Reactor hazards, Radioactive wastes, France.

The activation of argon 40 present in the air or in trace form in CO2 is particularly important. In G 1 the cooling is effected by atmospheric air which passes through the reactor and is expelled through a chimney. The activity due to argon 41 of the expelled air is about 0.0001 Ci/cu.m. For the reactors G 2 and G 3 the cooling is effected using CO2 in a closed circuit at a pressure of 15 kg/sq. cm. Although the argon content of industrial CO2 is practically constant, it can be influenced by that of the residual air left in the circuits during the start-up. The activity due to argon 41 of the heat-carrying fluid is about 0.001 Ci/cu.m. (Author)

PB-167 979 Field 18J, 5C
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Paris (France).
STUDY OF THE LONG-TERM VALUES AND PRICES OF PLUTONIUM; A SIMPLIFIED PARAMETRISED MODEL. VOLUME I: GENERAL DESCRIPTION OF THE STUDY (Etude des Valeurs et des Prix du Plutonium a Long Terme; Un Modele Parametre Simplifie. Volume I: Expose General de l'Etude),
by Jacques Gaussens and Henri Paillot.
May 65, 53p Rept. no. CEA-R-2795
Unclassified report

Into English and French.

Descriptors: (*Plutonium, Costs), (*Distribution-(Economics), Plutonium), Reactor fuels, Mathematical models, France.

The notions of use values and price of plutonium are defined. A simplified parametrised model is given, simulating the equilibrium of the offer and the demand in time, concerning the plutonium and the price deriving from the relative scarcity of this metal, taking into account the technical and economic operating parameters of the various reactors confronted. The model is simple enough to allow direct computations and establish clear relations between the various parameters. The use of the linear programs method allows a wide extension of the model. (Author)

PB-167 980 Field 18J, 5C
CFSTI Prices: HC$4.00 MF$1.00

Commissariat a l'Energie Atomique, Paris (France).
STUDY OF THE LONG-TERM VALUES AND PRICES OF PLUTONIUM; A SIMPLIFIED PARAMETRISED MODEL. VOLUME II: MATHEMATICAL DEVELOPMENT OF THE SIMPLIFIED PARAMETRISED MODEL AND APPLICATION. APPENDICES (Etude des Valeurs et des Prix du Plutonium a Long Terme un Modele Parametre Simplifie. Volume II. Developpement du Modele Parametre Simplifie et Application. Annexes),
by Jacques Gaussens and Henri Paillot.
May 65, 124p Rept. no. CEA-R-2795
Unclassified report

Into English and French; Appendices in French. Available copy will not permit fully legible reproduction.

Descriptors: (*Plutonium, Costs), (*Distribution-(Economics), Plutonium), Reactor fuels, Mathematical models, France.

The notion of use values and price of plutonium are defined. A simple parametrised model is given, simulating the equilibrium of the offer and the demand in time, concerning the plutonium and the price deriving from the relative scarcity of this metal, taking into account the technical and economic operating parameters of the various reactors confronted. The model is simple enough to allow direct computations and establish clear relations between the various parameters. The linear programs method allows a wide extension of the model. (Author)

PB-168 008 Field 18D, 18B, 18H
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Chusclan (France). Centre de Production de Plutonium de Marcoule.
CONTRIBUTION TO THE MICROOCALORIMETRIC STUDY OF THE CHARACTERISTICS OF RADIO-ELEMENTS AND TO THEIR QUALITATIVE AND QUANTITATIVE ANALYSIS (Contribution a l'Etude Microcalorimetrique de Caracteristiques des Radio-Elements et a Leurs Analyses Qualitative et Quantitative).
Doctoral thesis,
by Yves Ozias. Oct 64, 100p Unclassified report
Rept. no. CEA-R-2630
Text in French, Attached summary in English.

Descriptors: (*Radioactive isotopes, Analysis), (*Calorimeters, Radioactive isotopes), (*Plutonium, Analysis), Thermodynamics, Half life, Yttrium, Phosphorus, Sulfur, Iodine, Radiation measurement systems, Alpha particles, Beta particles, Gamma rays, Quantitative analysis, France.

The principle of the study consists in using the E. Calvet microcalorimeter for recording the energy flux emitted by radio-elements as a function of time, and in determining from this curve either their characteristics (half-life and radiation energy), or the composition of a mixture of radio-elements. In the first part the theoretical relationships describing radio-activity were adapted to the microcalorimetric study. In the second part an experimental determination was made, using the E. Calvet, microcalorimeter of the characteristics of various radio-elements, yttrium 90, phosphorus 32, sulphur 35, iodine 131, etc. and of their mixtures. In particular, a study was made of the isotopic analysis of a Pu239-Pu240 mixture, sometimes in the presence of Pu241. (Author)

PB-168 009 Field 18J, 18L
CFSTI Prices: HC$1.00 MF$0.50

Commissariat a l'Energie Atomique, Chusclan (France). Centre de Production de Plutonium de Marcoule.
RADIO-PROTECTION AND DECONTAMINATION OPERATIONS ON THE CENTRAL VIBRATING CHANNELS OF THE REACTOR G 3 (Radioprotection et Operations de Decontamination sur le Couloir Vibrant Central de la Pile G 3),
by Jean-Philippe Chassany, Gerard Cohendy, and Jean Rodier. May 65, 23p Rept. no. CEA-R-2781
Unclassified report

Text in French, Attached summary in English.

Descriptors: (*Reactor operation, Radiation hazards), (*Reactor system components, Decontamination), Shielding, Radioactivity, Dose rate, France.

The dose rate in the vibrating channels room of the discharge system, which is due to the contamination of one of the channels by a ruptured can was high. It was necessary to intervene in order that normal maintenance could be carried out on this equipment. The operation was carried out from a neighbouring room using cleaning tubes, and then directly, after numerous precautions had been taken. Radio-protection was made very difficult because of the irradiation and of the powdery state of the contamination. The average individual integrated dose for the 122 persons having taken part in this 2-month operation was 362 mrem. Thanks to the close collaboration between the operational, emergency and radio-protection personnel, this operation was executed smoothly and rapidly. (Author)

PB-168 076 Field 18C, 20D
CFSTI Prices: HC$2.00 MF$0.50

Institute of Mathematical Sciences, New York Univ., N. Y.
SPHERICAL WAVE PROPAGATION IN WATER. PART I, by Sherman G. Lowell. Oct 55, 29p
IMM-NYU-223
Contract Nonr28502
AFSWP 714 AD 076 378
Unclassified report

Descriptors: (*Nuclear explosions, Shock waves), (*Underwater explosions, Shock waves), (*Shock waves, Propagation), Numerical analysis, Pressure, Time, Energy, Velocity, Compressible flow, Fluid flow, Computers, Equations of state.

A theoretical analysis was made of the shock wave produced by an underwater atomic explosion. The purpose of the analysis is to determine the peak pressure, impulse and arrival time of the shock as a function of distance from the explosion and of the energy released. In addition the pressure and velocity distributions behind the shock were found. The various quantities mentioned above were determined in two different ways. These are (1) Numerical solution of the equations of compressible fluid flow, carried out on a UNIVAC. (2) Approximate analytical solution of the equations of compressible fluid flow.

PB-168 137 Field 18F, 18G, 18J
CFSTI Prices: HC$1.00 MF$0.50

Commissariat a l'Energie Atomique, Chusclan (France). Centre de Production de Plutonium de Marcoule.
DETECTION OF TRITIUM IN THE CO2 OF THE REACTORS G2/G3 USING GAS CHROMATOGRAPHY (La Detection du Tritium par Chromatographie Gazeuse dans le CO2 des Piles G2/G3),
by Pierre Guillermin and Jacky Rossi. Jun 65, 20p Rept. no. CEA-R-2800
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Reactor coolants, Radiological contamination), (*Tritium, Chromatographic analysis), (*Carbon dioxide, Radiological contamination), Exhaust gases, Radioactive wastes, Argon, Beta particles, Fission products, France.

A gas-phase chromatographic method, based on the principle of the decomposition of a gas mixture into its pure constituents, makes it possible to identify and rapidly measure the tritium present in the heat-carrying fluid of the reactors G2/G3. The sensitivity limit corresponds to 0.000005 micro-Ci/cu. cm of tritiated gas, whereas the treshold reading of the D.C.C.A. is 0.001 micro-Ci/cu. cm in the presence of A 41. This apparatus has interesting applications in the conditions where certain beta emitters (products of fission or of activation) interfere with the measurement of the tritium. It can easily be adapted to the detection of tritiated steam on condition that a reducing chemical treatment is applied for the atmospheric humidity. (Author)

PB-168 138 Field 18I
CFSTI Prices: HC$2.00 MF$0.50

Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etude Nucleaires.
GENERAL VIEWS ABOUT SPECIMEN IRRADIATIONS IN REACTORS (Considerations Generales sur les Irradiations d'Echantillons dans les Reacteurs),
by Maurice Seguin. Jul 65, 41p
Rept. no. CEA-R-2801
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Test reactors, Reviews), Containers, Compatibility, Standardization, Temperature control, France.

Specimen irradiation of fissile or non-fissile materials, carried out under circumstances becoming more and more severe and in reactor of increasing flux has resulted in a evolution of irradiation rigs. A survey of the problems arising from irradiating under these various circumstances leads to conclude that it is possible to devise one capsule type suitable to every particular case, and that in a wide temperature range. Consequently, once the various irradiation parameters known, a general method of calculation can be followed so as to determine the various sizes of the parts constituting the capsule. These theoretical calculations might sometimes be corrected through benefits gained from previous irradiations. Similarly, practical experimentation might allow to foresee more handy assembling of the capsule, specimen loading and unloading being easier at the same time. (Author)

19. Ordnance

Patent 3,190,179 Field 19F

DISCONNECTABLE CARTRIDGE BELT LINK.
Patent assigned to Army,
by Paul H. Benoit. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Feed mechanisms, Metallic belt links), Gun components, Patents.

A cartridge belt link is described in which the retained cartridge is transferred from it into a firearm chamber for discharge and the fired case is reinserted into the previously emptied link after discharge. The link structure includes a sleeve for resiliently retaining the shell of a cartridge and connectors on the sleeve.

Patent 3,190,514 Field 19A

BANDOLEER FOR CARTRIDGE, 40 MM.
Patent assigned to Army,
by James M. Spilman. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Grenades, Containers), (*Cartridges, Contxiners), (*Mortar ammunition, Containers), Polyethylene plastics, Protective coverings, Patents.

The bandoleer is formed of rigid material having a flap for retaining a cartridge in a fixed, safe position. It is designed for a shell grenade, such as the 40 mm. XM398. The device contains a number of pockets made of a plastic. A novel flap locks the cartridge in a pocket.

PB-146 679 Field 19A, 13H
CFSTI Prices: HC$2.00 MF$0.50

Feltman Research and Engineering Labs., Picatinny Arsenal, Dover, N. J.
EXPLOSIVE FORMING OF EXPLOSIVES.
Technical rept.,
by Robert W. Heinemann, Robert T. Schimmel, and Stanley J. Lowell. Jun 60, 33p
Rept. no. TR-2685
Projs. TW120, 504 03 61 Unclassified report
AD 238 633
Descriptors: (*Explosive materials, Explosive forming), (*Explosive forming, Explosive materials), TNT, RDX, Powders, Pellets, Rubber, Containers, Pressure.

The report describes an investigation of the feasibility of pressing explosives by a modification of the explosive pressing technique. Using this technique, Composition A-3 and TNT powders were pressed into pellets having densities as high as 1.66 and 1.61 g/cc, respectively. Theoretical densities for these explosives are 1.68 and 1.65 g/cc, respectively. Pellets as large as 2 x 2 1/2 inches were manufactured. The new technique was also used to press PB-RDX powder. Although only low-density PB-RDX pellets were manufactured with the makeshift equipment used, it was shown that PB-RDX powder can be pressed by the technique. (Author)

PB-168 146 Field 19H
CFSTI Prices: HC$4.00 MF$1.00

Pennsylvania State Univ., University Park. Coll. of Engineering and Architecture.
A STUDY OF TORPEDO PROPELLERS, PART I,
by B. W. McCormick, J. J. Eisenhuth, and J. E. Lynn.
30 Mar 56, 139p
Contract NORd16597 5 Unclassified report
AD 95 102
Available copy will not permit fully legible reproduction.

Descriptors: (*Propellers(Marine), Torpedoes), (*Torpedoes, Propellers(Marine)), Hydrodynamics, Design, Handbooks, Torpedo components, Performance-(Engineering), Cavitation, Wakes, Theory, Manufacturing methods.

An extensive study has been made of the hydrodynamics of torpedo propellers. By applying the vortex theory of propellers, with suitable conditions for the presence of a finite hub, finite thickness, and wide-blade effects, design methods are developed for both single and counter-rotating propellers. The importance of adapting the torpedo propeller to the wake in which it is to act is clearly shown. In addition, the effect of a hub vortex on the performance of a propeller is analyzed. The predicted performances of a number of single propellers and one pair of counterrotating propellers are compared with the experimental measurements. It is shown that, over a wide range of advance ratios, the agreement between the experimental and theoretical results is satisfactory. The problem of obtaining model propellers manufactured to a suitable degree of accuracy, is also discussed. The methods that have been developed for accomplishing this at the Ordnance Research Laboratory are presented in detail, as well as solutions to other problems encountered in the machining of such propellers. This report is intended as a handbook for the design of torpedo propellers. The necessary information that is required for performing the developed design procedures is included. (Author)

20. Physics

AD-279 280 Field 20A
CFSTI Price: HC$1.00

Mathematics Research Center, Univ. of Wisconsin, Madison.
THE REFRACTION OF A CONICAL PULSE AT A PLANE INTERFACE,
by M. Papadopoulos. Nov 61, 13p
Technical summary rept. no. MRC-TSR-276
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Scattering, Conical bodies), Sound, Supersonic characteristics, Potential theory, Integrals.

AD-406 441 Field 20I
CFSTI Prices: HC$2.00

California Univ., Berkeley. Dept. of Physics.
INTRODUCTION TO RECOMBINATION IN PLASMAS,
by A. E. Glassgold. 1 Jan 63, 39p
Technical rept. no. TR-5
Contract Nonr22270, Proj. NR014 304
Unclassified report

Descriptors: (*Plasma physics, Recombination reactions), (*Recombination reactions, Plasma physics), Ionization, Gas ionization, Atoms, Hydrogen, Photons, Electrons, Protons.

Contents:
Photoionization and recombination
Photoionization cross section
Radiative recombination cross section
Discussion of radiative recombination
The microscopic three-body recombination process
Microscopic reversibility and detailed balance for inelastic and superelastic collisions
Detailed balancing and three-body recombination
Thomson's theory of ionization and three-body recombination
Qualitative discussion of 'collisional-radiative' recombination.

AD-428 206 Field 20E
CFSTI Price: HC$1.00

United Aircraft Corp., East Hartford, Conn. Research Labs.
RESEARCH ON THE ELECTRICAL BREAKDOWN OF GASES UNDER INTENSE OPTICAL ILLUMINATION.
Final rept. for 1 Aug 63-30 Jan 64,
by R. G. Meyerand, Jr., and A. F. Haught.
27 Jan 64, 24p Rept. no. C-920088-2
Contract Nonr429900, ARPA Order 306
Unclassified report

Available copy will not permit fully legible reproduction.
Rept. on Proj. DEFENDER.

Descriptors: (*Lasers, Gases), (*Beams(Electromagnetic), High frequency), (*Gases, Beams(Electromagnetic), Gas ionization, Optical phenomena, Plasma physics, Attenuation, Absorption, Photons, Bremsstrahlung, Flash lamps, Xenon lamps, Air, Electric arcs, Photomultipliers, Helium, Argon.

A theoretical and experimental research program has been conducted on the physical mechanisms associated with the electrical breakdown of gases under the intense optical illumination from a laser. The light beam from a ruby laser was focused to a small region in the center of a test cell to ionize helium, argon, and air. Breakdown in air required the highest field strengths, the next highest were required to ionize helium, and the lowest field strengths were required for argon. Theoretical studies have indicated that the inverse Bremsstrehlung process, involving the absorption of optical photons by free electrons during collisions with gas atoms, satisfactorily accounts for the high degree of ionization produced during the short laser pulse and, in addition, predicts the observed pressure dependence of the breakdown. It was observed that as much as 50% of the total energy in the laser beam was absorbed in the plasma produced by breakdown and attenuations by as much as a factor of 10 were observed in the intensity of the laser beam at later times in the optical pulse. An extension of inverse Bremsstrahlung to the fully ionized case shows considerable promise as the process to account for this absorption. (Author)

AD-431 641 Field 20E, 11B
CFSTI Price: HC$1.00

American Optical Co., Southbridge, Mass.
NEODYMIUM LASER GLASS IMPROVEMENT PROGRAM.
Quarterly letter rept. no. 6,
by Richard F. Woodcock. 1964, 6p
Contract Nonr383500, Proj. 548; ARPA Order 306 62
Unclassified report

Descriptors: (*Lasers, Glass), (*Glass, Lasers), (*Neodymium, Lasers), Rods, Impurities, Fluorescence, Decay schemes, Absorption spectrum, Emissivity, Oxides, Life expectancy.

An investigation was made of the effects of composition of a neodymium-doped laser glass on its fluorescent lifetime: an analysis of the shape of the fluorescent decay curve; the quantum efficiency of the fluorescence process; and energy threshold measurements on laser rods made from small experimental glass melts.

AD-436 014 Field 20K, 11B
CFSTI Price: HC$2.00

Stanford Univ., Calif. Div. of Engineering Mechanics.
THE INFLUENCE OF VISCOELASTIC MATERIAL PROPERTIES ON DESIGN PROBLEMS,
by E. H. Lee. Jan 64, 31p Rept. no. 3, TR-146
Contract Nonr22569 Unclassified report
N64 18883

Descriptors: (*Viscoelasticity, Analysis), (*Creep, Analysis), (*Glass, Viscoelasticity), Materials, Design, Stresses, Strain(Mechanics), Loading(Mechanics), Thermal properties, Toughness.

Viscoelasticity comprises an irreversible relation between stress and strain which is governed by time effects. Stress distributions for viscoelastic bodies subjected to constant loads thus commonly vary with time. It is possible to utilize this flexibility of solution in some cases to meet stress design criteria. For example, the irreversibility embodied in viscoelasticity can lead to the production of a beneficial residual stress distribution following loading. Such an example is discussed. Temperature has a marked effect on viscoelastic characteristics, and thus supplies an additional controlling variable in selecting a design solution. Cooling slows down rate processes so that it may be possible to eliminate deleterious aspects of viscoelasticity in a particular design problem by selecting an appropriate temperature history. The example of the production of toughened glass by the interaction of viscoelasticity and temperature effects is cited. (Author)

AD-440 330 Field 20B, 20E, 20L
CFSTI Price: HC$1.00

Battelle Memorial Inst., Columbus, Ohio.
GROWTH OF RUBY CRYSTALS FROM SOLUTION.
Final technical summary rept. for 1 Jan-30 Apr 64,
by J. F. Miller, S. E. Miller, and H. L. Goering.
22 May 64, 12p
Contract Nonr382200, ARPA Order 306 62
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Crystal growth, Ruby), (*Ruby, Crystal growth), Lasers, Solutions, Salts, Sapphires, Lithium compounds, Aluminum compounds, Fluorides, Graphite, Containers, Temperature.

LiF-AlF3 solvents were used to grow large ruby crystals by a process based on the thermal-gradient technique. In developing the method and endeavoring to obtain the necessary control over the process, important factors such as temperature, temperature gradients, solvent composition, solute concentration, degree of agitation of the solution, seed-crystal rotation rate, and system geometry were studied as variables.

AD-442 059 Field 20E
CFSTI Price: HC$1.00

Eastman Kodak Co., Rochester, N. Y. Apparatus and Optical Div.
LASER MATERIAL STUDY.
Semi-annual technical rept. for 1 Jul-31 Dec 63,
by Paul B. Mauer. 31 Dec 63, 7p
Contract Nonr383400, ARPA Order 306 62
Unclassified report

Descriptors: (*Pumping(Electronics), Effectiveness), (*Lasers, Materials), Cesium alloys, Barium alloys, Silicates, Lithium alloys, Cesium, Glass, Borates, Neodymium, Impurities, Optical properties, Density, Absorption.

The problem of converting optical pumping energy to coherent laser output efficiently is undertaken. A cesium-barium silicate composition, a low melting lithium silicate glass, and small melt of the cesium glass has been made for absorption and fluorescence measurements. Table I summarizes some of the properties of the three glasses whose laser action are to be investigated. The rods for test are 12in long and 1/2in diameter, with a fine grind on the cylindrical surface. (Author)

CAPE-983 Field 20G

Lawrence Radiation Lab., Univ. of California, Livermore.
PROBE PLUNGER: MARK IV.
Engineering materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Bevatrons, Mechanical drawings).

(115 drawings) A pneumatically operated plunger used to translate targets into and out of the aperture at the Bevatron Experimental Facility is described. The device may also be used for all general target applications. (AEC abstract)

N65-19852 Field 20D, 1A
CFSTI Prices: HC$3.00 MF$0.75

Case Inst. of Tech., Cleveland, Ohio.
AN ANALYSIS OF CONFINED VORTEX FLOWS.
Master's thesis,
by David E. Loper. Jun 64, 67p Technical rept. no. A-31
NASA CR-57401
Unclassified report

Descriptors: (*Vortices, Mathematical analysis).

N65-19867 Field 20L, 18H
CFSTI Prices: HC$1.00 MF$0.50

Illinois Univ., Urbana. Dept. of Physics.
AN EXPERIMENTAL INVESTIGATION OF RADIATION EFFECTS IN SEMICONDUCTORS.
Semiannual status rept. for 1 Jul-31 Dec 64,
by W. Dale Compton. 31 Dec 64, 13p
Grant NsG228 62 Unclassified report
NASA CR-57471

Descriptors: (*Semiconductors, Radiation damage), (*Radiation damage, Semiconductors), Crystal lattice defects, Atomic energy levels.

N65-19870 Field 20L, 18H
CFSTI Prices: HC$2.00 MF$0.50

TRW Space Technology Labs., Redondo Beach, Calif.
CHARGED PARTICLE RADIATION DAMAGE IN SEMICONDUCTORS, X: THE ENERGY DEPENDENCE OF ELECTRON DAMAGE IN SILICON.
3 Sep 64, 43p Rept. no. STL-4161-6004-KU-000
Contract NAS5-3805
NASA CR-57478
Unclassified report

Descriptors: (*Silicon, Radiation damage), (*Electron bombardment, Silicon), Semiconductors.

N65-19875 Field 20L
CFSTI Prices: HC$1.00 MF$0.50

Lockheed Missiles and Space Co., Sunnyvale, Calif.
ELECTROLYTIC PREPARATION OF HIGH DIELECTRIC THIN FILMS.
Quarterly rept. for 4 Nov 64-3 Feb 65,
by A. E. Hultquist and M. E. Sibert. 8 Feb 65, 18p
LMSC-A034389
Contract NASw969 Unclassified report
NASA CR-57483

Descriptors: (*Films, Preparation), (*Electrolysis, Films), Dielectric properties, Refractory metals.

N65-21645 Field 20H
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
BACKSCATTERING AND SECONDARY-ELECTRON EMISSION FROM METAL TARGETS OF VARIOUS THICKNESS,
by Allan J. Cohen and Kenneth F. Koral. May 65,
33p NASA-TN-D-2782
Unclassified report

Descriptors: (*Electrons, Scattering), (*Secondary emission, Metals), Electron bombardment.

N65-21646 Field 20C
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.

THERMAL, FIELD EMISSION WITH A TERMINATED IMAGE POTENTIAL,
by James F. Morris. Apr 65, 25p NASA-TN-D-2784
Unclassified report

Descriptors: (*Field emission, Potential theory), Thermal radiation, Electric currents.

N65-22367 Field 20D
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
BLUNT BODY SOLUTIONS FOR SPHERES AND ELLIPSOIDS IN EQUILIBRIUM GAS MIXTURES,
by Mamoru Inouye. May 65, 33p NASA-TN-D-2780
Unclassified report

Descriptors: (*Gas flow, Blunt bodies), (*Supersonic flow, Blunt bodies), Spheres, Ellipsoids.

N65-23165 Field 20I
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
HYDROMAGNETIC STABILITY,
by S. P. Talwar. May 65, 12p NASA-TN-D-2791
Unclassified report

Descriptors: (*Magnetohydrodynamics, Stability).

N65-23714 Field 20D, 21H
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
DIGITAL DISTRIBUTED PARAMETER MODEL FOR ANALYSIS OF UNSTEADY FLOW IN LIQUID-FILLED LINES,
by Don J. Wood, Robert G. Dorsch, and Charlene Lightner. May 65, 47p NASA-TN-D-2812
Unclassified report

Descriptors: (*Pipes, Fluid flow), (*Fluid flow, Mathematical models).

N65-23821 Field 20I
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EQUILIBRIUM COMPUTATIONS FOR MULTI-COMPONENT PLASMAS,
by Frank J. Zeleznik and Sanford Gordon. May 65, 25p NASA-TN-D-2806
Unclassified report

Descriptors: (*Plasma medium, Stability), Thermodynamics, Ionization potentials.

N65-23823 Field 20K
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
COLLAPSE TESTS OF PRESSURIZED MEMBRANE-LIKE CIRCULAR CYLINDERS FOR COMBINED COMPRESSION AND BENDING,
by Walter J. Leaumont, Jr. May 65, 16p
NASA-TN-D-2814
Unclassified report

Descriptors: (*Cylindrical bodies, Tensile properties), (*Pressure vessels, Deformation).

N65-24521 Field 20C
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
PADE APPROXIMANT CALCULATION OF THE SINGULARITY IN THE MAGNETIC SUSCEPTIBILITY OF AN ISING SQUARE LATTICE,
by A. V. M. Ferris-Prabhu. Jun 65, 11p
NASA-TN-D-2822
Unclassified report

Descriptors: (*Magnetic properties, Functional analysis), Power series, Ferromagnetism.

N65-24773 Field 20A
CFSTI Prices: HC$3.00 MF$0.75

Columbia Univ., New York.
ABSORPTION OF SOUND IN AIR BELOW 1000 CPS,
by Cyril M. Harris and W. Tempest. Jun 65, 58p
Contract NAS8 11002
NASA CR-237
Unclassified report

Descriptors: (*Sound, Absorption), (*Engine noise, Launch vehicles(Aerospace)), Air.

Patent 3,191,092 Field 20I, 21C

PLASMA PROPULSION DEVICE HAVING SPECIAL MAGNETIC FIELD.
Patent assigned to AEC,
by William R. Baker, Klaus Halback, and Robert W. Layman. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Ion engines, Space propulsion), (*Plasma jets, Electric propulsion), Magnetohydrodynamics, Plasma medium, Patents.

The device can be used as a propulsion system for space vehicles and as a stationary source of heated plasma for injection into a thermonuclear power device. The plasma generator converts Larmor and drift forms of energy in a rotating plasma to axially directed kinetic energy to eject the plasma from the generator.

PB-167 586 Field 20K
CFSTI Prices: HC$3.00 MF$0.75

Mathematics Research Center, Univ. of Wisconsin, Madison.
KINEMATICS OF SINGULAR SURFACES AND WAVES,
by C. Truesdell. Oct 58, 91p
Technical summary rept. no. MRC-TSR-43
Contract DA11 022ORD2059 Unclassified report
AD 208 053
Descriptors: (*Surfaces, Mechanics), (*Mechanical waves, Propagation), Differential geometry, Vortices, Shock waves, Deformation, Acceleration, Transport problems.

Those properties of surfaces of discontinuity, such as vortex sheets, shock waves, and acceleration waves, as are common to all media are organized and described. Conditions are derived that hold at any given instant and express the fact that the discontinuity is spread out smoothly over a surface, not isolated at a point or a line. A general differential description of moving surfaces is presented. Kinematical conditions expressing the persistence of a surface of discontinuity are proved. The various kinds of discontinuities associated with the motion of a material are classified and simple theorems characterizing them are proved. The general form taken on by a law of physics when applied at a surface of discontinuity is obtained.

PB-167 615 Field 20K, 12A
CFSTI Prices: HC$3.00 MF$0.75

Naval Weapons Lab., Dahlgren, Va.
THE LONGITUDINAL MOTION OF A VIBRATING ROD WITH ATTACHED MASS IN A RESISTING MEDIUM,
by John D. Somes. 24 Jul 64, 79p
Rept. no. NWL-1931
AD 447 104

Unclassified report

Descriptors: (*Rods, Vibration), (*Vibration, Damping), Elasticity, Loading(Mechanics), Friction, Integral transforms, Series, Complex variables, Bessel functions.

The solution for the longitudinal motion of an elastic rod with a mass attached at one end is extended to the case where the motion is subject to linear frictional damping. The friction acting on the rod and on the mass may be specified separately. Laplace Transform methods are employed in the solution, and extensions are derived both for the residue (infinite series) solution and for the solution in the form of superposed waves (closed solution). Some discussion is devoted to a computer program developed to handle the general residue solution, and a set of numerical results is given. (Author)

PB-167 709 Field 20C
CFSTI Prices: HC$2.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
SPHERICAL MEANS AND RADIATION CONDITIONS,
by Calvin H. Wilcox. Nov 58, 30p
Technical summary rept. no. MRC-TSR-61
Contract DA11 022ORD2059
AD 207 992

Unclassified report

Descriptors: (*Potential theory, Electromagnetic waves), Boundary value problems, Special functions-(Mathematical), Field theory, Diffraction.

PB-168 090 Field 20H, 20G
CFSTI Prices: HC$2.00 MF$0.50

Office of Science and Technology, Washington, D. C. Ad Hoc Panel on Meson Factories.
MESON FACTORIES,
Mar 64, 35p

Unclassified report

Descriptors: (*Mesons, Proton accelerators), Nuclear structure, Proton bombardment, Pions, Muons, Neutrinos.

The usefulness of Meson Factories is considered. These are accelerators which produce proton beams of medium energy (300 - 1,000 Mev) and very high intensity (0.1 - 1 milliampere average current, or more). The protons can be used to produce, in a suitable target, very intense secondary pi-meson beams. From the decay of pi-mesons, mu-mesons and neutrinos can be obtained.

PB-168 093 Field 20N, 17B
CFSTI Prices: HC$4.00 MF$1.00

Raytheon Co., Waltham, Mass. Charles River Lab.
PULSE CODE MODULATION SYSTEMS, VOLUME 1,
Semiannual progress rept. no. 4, 15 Jun-14 Dec 60,
by W. Hatton, E. Bond, G. Partridge, G. Lampke, and K. Balekdjian. 14 Dec 60, 117p
Contract DA36 039sc78148
AD 252 701

Unclassified report

Descriptors: (*Pulse modulation, Communication systems), (*Coding Communication systems), Modulators, Circuits, Oscillators, Transistors, Radio communication systems.

The ETM models are coming out of the shop, and changes brought about by the configuration and cabling of these units are discussed. One transistor type changed so radically between the military and commercial versions that it had to be replaced in many of its applications. Engineering unit tests and system tests are reported. Operation with the AN/GRC-50 and AN/GRC-66 was tried and is discussed. (Author)

PB-168 094 Field 20N
CFSTI Prices: HC$1.00 MF$0.50

Ohio State Univ. Research Foundation, Columbia. Antenna Lab.
THE DIFFRACTION OF A SURFACE WAVE BY A RIGHT ANGLED WEDGE,
by Ta-Shing Chu. 21 Mar 60, 16p
Rept. no. OSURF-1035-2
Contract DA36 039sc84920, Proj. 3 99 00 000

Unclassified report

Descriptors: (*Electromagnetic waves, Diffraction), Wedges, Wave transmission, Antenna radiation patterns, Mathematical analysis.

The diffraction of surface waves is significant in the design of surface wave antennas; for this reason, the diffraction of an electomagnetic surface wave incident on a right-angled wedge is treated. The wedge is reactive on one surface and perfectly conducting on the other. An exact mathematical solution has been obtained. The far field diffraction pattern is given by an asymptotic representation which shows a simple dependence on the geometrical configuration. The reflection coefficient is also expressed in a compact form and has been computed as a function of the surface reactance. (Author)

PB-168 097 Field 20K
CFSTI Prices: HC$3.00 MF$0.75

Illinois Univ., Urbana. Dept. of Theoretical and Applied Mechanics.
A PAPKOVICH-NEUBER SOLUTION FOR THE STRESSES AND DISPLACEMENTS IN AN INFINITELY LONG HOLLOW CIRCULAR CYLINDER,
by Charles C. Fretwell and Arthur P. Boresi. Jun 1965, 69p Technical rept. TR-5, T. and A.M.-278
Grant NSF GP903 Unclassified report

Descriptors: (*Stresses, Cylindrical bodies), (*Numerical analysis, Loading(Mechanics)), Elasticity, Deformation, Structural shells, Partial differential equations, Fourier analysis, Series, Integrals.

The purpose of this investigation is to develop a solution to the problem of an arbitrarily loaded infinitely long hollow circular cylinder of any thickness. The three dimensional equations of elasticity are taken as the governing equations and the conditions of linear elasticity are assumed. The goals of this study are to make available results for the study of an exact solution to the problem and to make available a criterion for determining the validity of shell solutions already existing for the problem. The Papkovich-Neuber solution of the three dimensional equations is used and the solutions of the resulting partial differential equations are given in the form of a Fourier series whose coefficients are infinite integrals. These solutions, which are placed in dimensionless form, are appropriately differentiated to obtain the displacements and stress equations applicable to the problem. By expansion of the boundary conditions into a Fourier series of Fourier integrals, the unknown quantities arising from the integration of the differential equations can be determined and, thus, a complete solution to the problem is found. Applications to the problem are made in the form of constant uniformly distributed spot loads, parabolically distributed spot loads, and exponentially distributed loads and numerical results are presented for some of these applications. (Author)

PB-168 098 Field 20E, 20K
CFSTI Prices: HC$1.00 MF$0.50

Illinois Univ., Urbana. Dept. of Theoretical and Applied Mechanics.
APPLICATIONS OF LASERS TO PHOTOELASTICITY,
by C. E. Taylor, C. E. Bowman, W. P. North, and W. F. Swinson. Mar 65, 23p
Rept. no. T. and A. M.-276
Unclassified report

Descriptors: (*Lasers, Photoelasticity), (*Photoelasticity, Lasers), Light, Scattering, Polarization, Optical equipment, Operation.

The paper discusses briefly the principles of gaseous and ruby lasers and makes comparisons of pertinent properties of lasers and conventional light sources. Since the output from a laser is a highly collimated beam of monochromatic light that can be made extremely intense and plane polarized, the eminent suitability of lasers as light sources for photoelasticity is suggested. Lasers are shown to be superior to conventional light sources, especially for the scattered light method and for high speed dynamic work. Experiments are described and results are given for using lasers for (1) the scattered light method, (2) a conventional transmission polariscope with static loads, and (3) dynamic photoelasticity. (Author)

PB-168 127 Field 20J, 12A
CFSTI Prices: HC$2.00 MF$0.50

Columbia Univ., New York. Dept. of Mathematics.
TRANSFORMATIONS OF STATES IN OPERATOR THEORY AND DYNAMICS,
by Richard V. Kadison. 1964, 47p
Rept. no. CU-2-NSF-GP1604-M
Grant NSF GP1604
Unclassified report

Descriptors: (*Quantum mechanics, Operators-(Mathematics)), (*Dynamics, Transformations(Mathematics), Algebraic topology, Hamiltonian, G roups(Mathematics).

Proceeding from the assumption that the bounded observables of a physical system are the self-adjoint elements of a C* algebra and some plausible physical assumptions about the way states evolve in time, as much as possible of the usual formulation of quantum dynamics is derived. Adding conditions on the algebra of observables and on the dynamical group, by steps, a full analog of the Schroedinger picture is derived.

PB-168 160 Field 20L, 20B
CFSTI Prices: HC$2.00 MF$0.50

Cruft Lab., Harvard Univ., Cambridge, Mass.
FIELD EMISSION FROM GERMANIUM IN A MULLER FIELD EMISSION MICROSCOPE,
by Frederick G. Allen. 5 Dec 55, 38p
Technical rept. no. TR-237
Contract N5ori7601, Proj. NR372 012
AD 91 606
Unclassified report

Descriptors: (*Germanium, Microscopy), (*Microscopy, Germanium), (*Field emission, Germanium), Single crystals, Crystal structure, Etched crystals, Work functions, Atomic energy levels, Surface properties.

A description is given of work which resulted in the production of the first reported instance of symmetrical field-emission patterns from germanium.

PB-168 188 Field 20I, 20D
CFSTI Prices: HC$1.00 MF$0.50

New York Univ., N. Y. Dept. of Aeronautics and Astronautics.
SOME UNCONVENTIONAL MATHEMATICAL PROBLEMS IN MAGNETO-HYDRODYNAMICS,
by C. K. Chu. Jan 63, 22p
Rept. no. NYU-AA-63-1 Unclassified report
Grant NSF G24351
Prepared for presentation at the American Physical Society, Symposium of the Divisions of Fluid Dynamics and Plasma Physics, Northwestern Univ., 20 Jun 62.

Descriptors: (*Magnetohydrodynamics, Mathematical analysis), Gas flow, Subsonic flow, Transonic flow, Supersonic flow, Airfoils, Partial differential equations.

Problems arising in the theory of steady, inviscid, infinitely-conducting, compressible magnetohydrodynamics, which may be considered as direct generalizations of similar problems in ordinary gas dynamics, are discussed. In each case, the gas dynamical problem is well-known and fully understood, and the results are generally regarded as 'intuitively evident'; in each case, the corresponding magnetohydrodynamic problem involves additional non-obvious mathematical finesse, and the results reveal certain interesting and unexpected physical phenomena, which are by no means intuitively evident until the solution is obtained. The three problems described have their gas dynamic counterparts arising from the three different regimes of flow: subsonic flow, transonic flow, supersonic flow. As is well known, the flows in these regions are governed by partial differential equations of different types, and the nature of these flows is fundamentally different.

PB-168 192 Field 20D, 1A
CFSTI Prices: HC$3.00 MF$0.75

Harvard Univ., Cambridge, Mass. Div. of Engineering and Applied Physics.

ON THE MATHEMATICS OF FLUIDISATION. I. STEADY MOTION OF FULLY DEVELOPED BUBBLES.
Technical rept.,
by James D. Murray. Oct 63, 72p
Rept. no. TR-1
Grant NSF GP2226
Unclassified report

Descriptors: (*Bubbles, Fluid flow), (*Fluid flow, Continuum mechanics), (*Particles, Fluid flow), Mathematical models, Drag, Gravity, Wake, Vortices, Motion, Cylindrical bodies, Partial differential equations, Petroleum industry.

Fluidisation is the process whereby a bed of appropriately sized particles is subjected to a flow of fluid upwards through the bed at a speed sufficient for the gravitational forces on the particles to be balanced by the drag forces. The particles in general do not appear to be in contact in the state of fluidisation. A mathematical model is set up to describe the macroscopic phenomena on a continuum basis. The equations show that the system when it is not turbulent is unstable to small disturbances. The instability manifests itself in bubbles of the fluidising fluid passing up through the bed; such bubbles are a feature of gas fluidised beds and in general not a feature of liquid fluidised beds which are usually turbulent. The fluid mechanical properties of the system are studied for the case of fully developed bubbles in a steady state. The solutions obtained are shown to be in fair agreement with experiment. It is suggested that the equations derived will be adequate for most bubble motions and the resulting gross particle movement in a fluidised bed. (Author)

PB-168 252 Field 20F
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
AUTOCOLLIMATORS: SIMULTANEOUS BIDIRECTIONAL.
Technical manual instrument calibration procedure, ML-01.
1 May 65, 25p NAVWEPS-17-20ML-01
Unclassified report

Descriptors: (*Collimators, Calibration), (*Calibration, Collimators), Instruction manuals, Test methods, Lenses, Test equipment, Telescopes, Optical equipment.

The procedure describes the calibration of simultaneous bidirectional autocollimators. A partial list of these autocollimators is given. Each instrument is an autocollimating-type telescope with a measuring eyepiece for determining the angular displacement of an internally illuminated target image as reflected from a surface placed approximately normal to the emitted light beam. The movable reticles viewed in the measuring eyepiece are controlled by two micrometers with their axes at right angles to one another so as to provide for simultaneous measurements in both the horizontal and vertical planes. The Fleet Ballistic Missile Weapon Systems AC-1 and AC-2 instruments have the additional capability over most of their commercial equivalents of making measurements in the red and blue, as well as the green, regions of the light spectrum so as to meet special requirements of the FBMWS program. (Author)

SB-488 Suppl. 2 Field 20E

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
MASERS AND LASERS.
Price list, selective bibliography of Government research repts. and translations for Aug 63-Jun 65.
Jun 65, 27p Unclassified report

Available free from the Clearinghouse.

Descriptors: (*Lasers, Bibliographies), (*Masers, Bibliographies), Scientific research, Semiconductor devices, Liquids, Gases, Communication equipment, Medical research, Biology, Hazards, Printing, Metallurgy.

Lists 473 domestic and foreign references added to the CFSTI collection during the period August 1963 through June 1965. Covers research on laser and maser materials; semiconductor laser and laser ranging devices and techniques; liquid lasers, gas lasers, injection lasers, infrared lasers, glass lasers, fiber optic lasers, optical masers; lasers in communications, biological and medical research, printing, and metallurgy; biological hazards of masers and lasers.

21. Propulsion and Fuels

AD-406 348 Field 21E, 14B
CFSTI Price: HC$5.00

General Electric Co., West Lynn, Mass. Instrument Dept.
TURBOJET ENGINE ANALYZER DESIGN STUDY,
by M. E. Douglass. Apr 63, 157p
Contract AF33 616 8508, Proj. 3147, Task 314702
ASD TDR-62-975
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Turbojet engines, Test methods), Design, Jet engines, Tests, Feasibility studies, Performance-(Engineering), Vibration, Failure(Mechanics), Airplane engine oil, Contamination, Analysis, Lubrication, Pressure, Temperature, Stresses.

This report outlines methods of determining the condition of jet engines through measurement of performance sensitive parameters. The measurements required, test procedures, data processing, interpretation of results, and tentative limits are proposed. Estimates of the accuracy of the condition assessment, limiting conditions and measurement accuracies are included. The 'state-of-the-art' in engine condition determination through non-performance sensitive parameters is reviewed and programs for advancing it are proposed. (Author)

AD-430 571 Field 21E
CFSTI Price: HC$1.00

Garrett Corp., Los Angeles, Calif. AiResearch Mfg. Div.
VEIL COOLING OF RADIAL-FLOW TURBINES.
Supplemental rept.,
by M. Branger. 24 Jan 64, 7p Rept. no. K-518
Contract NONR368500
N64 16508
Unclassified report

Descriptors: (*Gas turbines, Film cooling), Jets, Heat transfer, Ejection, Air cooled.

This supplement presents results obtained in limited tests with 1500F turbine gas inlet temperature. The position of the cooling jet with respect to the disk of the wheel

was found to be an important parameter in veil cooling. When the flow of the issuing cooling jet is at the surface of the disk, it provides a high temperature gradient for heat transfer, but it does not induce any considerable mixing with the main gas stream, and thus does not promote a high heat transfer. When the cooling jet is directed at a slight distance from the surface of the disk, there is more cooling gas mixing with the main gas stream, and the effect of this spacing required investigation to provide a sound basis for higher temperature tests of veil cooling effects.

N65-20404 Field 21H, 20M, 21F
CFSTI Prices: HC$3.00 MF$0.75

United Aircraft Corp., East Hartford, Conn.
THEORETICAL INVESTIGATION OF THE ABSORPTION AND SCATTERING CHARACTERISTICS OF SMALL PARTICLES,
by N. L. Krascella. Apr 65, 57p
Contract NASw847
NASA CR-210
Unclassified report

Descriptors: (*Rocket motors, Heat transfer), (*Heat transfer, Control), Particles, Scattering.

N65-24375 Field 21C
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
AN ELECTROLYTIC TANK ANALOG FOR TWO-DIMENSIONAL ANALYSIS OF ELECTROSTATIC-THRUSTOR OPTICS,
by John F. Staggs. May 65, 33p NASA-TN-D-2803
Unclassified report

Descriptors: (*Ion engines, Analog systems), (*Space charges, Electric currents), Electrodes.

N65-24376 Field 21C, 20I
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
A TECHNIQUE FOR OBTAINING PLASMA-SHEATH CONFIGURATIONS AND ION OPTICS FOR AN ELECTRON-BOMBARDMENT ION THRUSTOR,
by Eugene V. Pawlik, Paul M. Margosian, and John F. Staggs. May 65, 32p NASA-TN-D-2804
Unclassified report

Descriptors: (*Ion engines, Electron bombardment), (*Plasma sheath, Configuration), Ion beams, Optics.

N65-25549 Field 21C
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
PRELIMINARY OPERATION OF OXIDE-COATED BRUSH CATHODES IN ELECTRON-BOMBARDMENT ION THRUSTORS,
by William R. Kerslake. Jun 65, 12p NASA-TM-X-1105
Unclassified report

Descriptors: (*Ion engines, Cathodes), (*Cathodes, Ion engines).

Patent 3,190,305 Field 21H, 21I

MIXTURE RATIO CONTROL VALVE.
Patent assigned to Army,
by William A. Schulze. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Gate valves, Propellant control), (*Propellant control, Gate valves), (*Liquid rocket propellants, Propellant control), Liquid rocket fuels, Oxygen, Liquefied gases, Combustion chambers, Mixtures, Rocket trajectories, Patents.

The manually or remotely adjustable gate-type, flow differential control valve regulates the mixture ratio of the fuel and liquid oxygen entering the thrust chamber of a liquid propellant rocket. Use of the valve results in more accurate trajectory reproducibility because of less variation in cut-off weights.

Patent 3,191,792 Field 21H, 21F

MEMBRANE DOUBLE WALL INTERCONNECTED PRESSURE VESSEL.
Patent assigned to AEC,
by David A. Hunt. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Pressure vessels, Rocket cases), (*Rocket cases, Design), Coolants, Patents, Nuclear propulsion.

The vessel may be designed to contain a large nuclear rocket engine. The pressure vessel, of the type requiring a double wall for internal cooling, includes an inner wall, an outer wall and a multiplicity of radial ribs connecting the walls at uniform intervals so as to define a multiplicity of longitudinal coolant channels of identical cross section.

PB-167 683 Field 21I, 7D, 20M
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Mines, Bartlesville, Okla. Bartlesville Petroleum Research Center.
THERMODYNAMICS OF ORGANIC DERIVATIVES OF THE LIGHTER ELEMENTS.
Quarterly technical summary rept. no. 20, 1 Oct-31 Dec 63,
by D. R. Douslin, H. L. Finke, W. D. Good, and D. W. Scott. Dec 63, 6p
Contract CS059 9, ARPA Order 416 Unclassified report
AD 429 092

Descriptors: (*Rocket fuels, Thermal properties), (*Fluorine compounds, Thermodynamics), (*Aluminum compounds, Thermodynamics), (*Boron compounds, Thermodynamics), (*Thermochemistry, Rocket fuels), Organic compounds, Halogenated hydrocarbons, Combustion, Vapor pressure, Vaporization, Entropy, Metalorganic compounds, Nitrogen compounds.

Combustion studies of two nitrogen-fluorine compounds are being pursued, and trial tests are being made of a promising new scheme for burning, accurately, the intractable aluminum and aluminum-boron compounds. Combustion experiments on hexafluorobenzene were completed. Measurements of the low-temperature thermal properties of triethyl-aluminum are under way. Vapor pressures and the heats of vaporization of hexafluorobenzene were completed. Entropy values for hexafluorobenzene, obtained from the low-temperature calorimetry and vapor pressure measurements, indicate that a revision of the Steele and Whiffin vibrational assignment is needed. (Author)

22. Space Technology

N65-19773 Field 22A, 8N, 3B, 20I
CFSTI Prices: HC$4.00 MF$0.75

National Aeronautics and Space Administration, Washington, D. C.
ROCKET EXPERIMENTS IN COSMIC MAGNETISM AND THEIR SIGNIFICANCE,
by C. P. Sonett. 1964, 108p NASA-TMX-56142
Unclassified report

Descriptors: (*Rocket research, Upper atmosphere), (*Magnetohydrodynamics, Cosmic rays), Terrestrial magnetism, Space probes.

N65-20476 Field 22C, 16B, 20I
CFSTI Prices: HC$3.00 MF$0.75

Avco-Everett Research Lab., Everett, Mass.
ON THE USE OF MAGNETOHYDRODYNAMICS DURING HIGH SPEED RE-ENTRY,
by P. O. Jarvinen. Apr 65, 62p
Contract NASw748
NASA CR-206
Unclassified report

Descriptors: (*Atmosphere entry, Magnetohydrodynamics), (*Magnetohydrodynamics, Atmosphere entry), Aerodynamic heating, Deceleration.

N65-20996 Field 22B, 22A
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Houston, Tex. Manned Spacecraft Center.
MODEL SOLAR PROTON ENVIRONMENTS FOR MANNED SPACECRAFT DESIGN,
by Jerry L. Modisetter, Terence M. Vinson, and Alva C. Hardy. Apr 65, 23p NASA-TN-D-2746
Unclassified report

Descriptors: (*Space environmental conditions, Manned spacecraft), (*Proton bombardment, Manned spacecraft), Solar radiation.

N65-21163 Field 22B
CFSTI Prices: HC$1.00 MF$0.75

National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
COMMUNICATIONS SATELLITES, A CONTINUING BIBLIOGRAPHY,
Rept. for May 64-Jan 65.
Apr 65, 60p NASA-SP-7004(01)
Unclassified report

Descriptors: (*Communication satellites(Active), Bibliographies), (*Communication satellites(Passive), Bibliographies).

N65-23799 Field 22A, 6K
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Houston, Tex. Manned Spacecraft Center.
VENUS AND MARS, NOMINAL NATURAL ENVIRONMENT FOR ADVANCED MANNED PLANETARY MISSION PROGRAMS,
by Dallas E. Evans, David E. Pitts, and Gary L. Kraus. 1965, 46p NASA-SP-3016 Unclassified report

Descriptors: (*Venus probes, Space environmental conditions), (*Mars probes, Space environmental conditions), (*Space environmental conditions, Space flight), Planetary atmospheres, Manned spacecraft.

N65-23814 Field 22B, 9F
CFSTI Prices: HC$5.00 MF$1.00

Little (Arthur D.), Inc., Cambridge, Mass.
AN EXAMINATION OF THE APPLICABILITY OF MICROELECTRONIC CIRCUITS TO THE TELEMETRY AND COMMAND SUBSYSTEMS OF SEVERAL APPLICATIONS SPACECRAFT.
May 65, 146p
Contract NASw732 Unclassified report
NASA CR-223

Descriptors: (*Spacecraft, Telemeter systems), (*Telemeter systems, Microminiaturization(Electronics)), Command + control systems, Design.

N65-23820 Field 22B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
ANALYTICAL LIFETIME STUDIES OF A CLOSE-LUNAR SATELLITE,
by William R. Wells. May 65, 39p NASA-TN-D-2805
Unclassified report

Descriptors: (*Lunar satellites, Life expectancy).

N65-23830 Field 22B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
SOME DESIGN CONSIDERATIONS FOR SPIN-STABILIZED SATELLITES WITH RIGID EXPANDABLE STRUCTURES,
by Robert H. Johns, Reeves P. Cochran, and David A. Spera. May 65, 38p NASA-TM-X-1061
Unclassified report

Descriptors: (*Satellites(Artificial), Design).

N65-24019 Field 22B
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Washington, D. C. Performance Analysis and Control Configuration Management.
APOLLO PROGRAM: MASS PROPERTIES STANDARD,
by M. L. Seccomb. 1 Jun 65, 92p
NASA-SP-6004; CMO 18-001-1
Unclassified report

Descriptors: (*Lunar craft, Physical properties), (*Weight, Manned spacecraft), Center of gravity, Moment of inertia.

N65-24372 Field 22B, 1A
CFSTI Prices: HC$6.00 MF$1.25

National Aeronautics and Space Administration, Houston, Tex. Manned Spacecraft Center.
NEWTONIAN AERODYNAMICS FOR BLUNTED RAKED-OFF CIRCULAR CONES AND RAKED-OFF ELLIPTICAL CONES,

by Edward E. Mayo, Robert H. Lamb, and Paul O. Romere. May 65, 235p NASA-TN-D-2624
Unclassified report

Descriptors: (*Conical bodies, Aerodynamic characteristics), (*Reentry vehicles, Design).

N65-24373 Field 22B, 1A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
AERODYNAMIC CHARACTERISTICS OF TWO TRAILBLAZER II BLUNTED 9 DEGREE CONE REENTRY BODIES AT MACH 6.8 IN AIR AND 21.2 IN HELIUM,
by Herbert R. Schippell, Luther Neal, Jr., and Don C. Marcum, Jr. May 65, 34p NASA-TN-D-2786
Unclassified report

Descriptors: (*Reentry vehicles, Aerodynamic characteristics), (*Conical bodies, Aerodynamic characteristics).

N65-24379 Field 22B
CFSTI Prices: HC$3.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
GEOMETRIC SHAPE FACTORS FOR PLANETARY-THERMAL AND PLANETARY-REFLECTED RADIATION INCIDENT UPON SPINNING AND NONSPINNING SPACECRAFT,
by Lenwood G. Clark and E. Clay Anderson. May 65, 53p NASA-TN-D-2835
Unclassified report

Descriptors: (*Thermal radiation, Planets), (*Spacecraft, Thermal properties), Space environmental conditions, Solar radiation.

N65-24381 Field 22C
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Aeronautics, Langley Station, Va. Langley Research Center.
ANALYSIS OF MARS ENTRY WITH CONSIDERATION OF SEPARATION AND LINE-OF-SIGHT RELAY COMMUNICATION FOR BUS-CAPSULE COMBINATIONS,
by E. Brian Pritchard and Edwin F. Harrison. May 65, 70p NASA-TN-D-2841
Unclassified report

Descriptors: (*Mars, Atmosphere entry), (*Atmosphere entry, Mars).

N65-24772 Field 22B
CFSTI Prices: HC$6.00 MF$1.25

Astro-Electronics Div., Radio Corp. of America, Princeton, N. J.
FLYWHEEL STABILIZED, MAGNETICALLY TORQUED ATTITUDE CONTROL SYSTEM FOR METEOROLOGICAL SATELLITES.
Rept. for 25 May-13 Oct 64.
May 65, 209p
Contract NAS5 3886
NASA CR-232
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Descriptors: (*Attitude control systems, Meteorological satellites), (*Meteorological satellites, Attitude control systems).

N65-25274 Field 22B, 22D
CFSTI Prices: HC$2.00 MF$0.75

Douglas Aircraft Co., Inc., Santa Monica, Calif.
SOME CONSIDERATIONS IN THE FATIGUE DESIGN OF LAUNCH AND SPACECRAFT STRUCTURES,
by R. H. Christensen and R. J. Bellinfante. Jun 65, 109p
Contract NAS7 298
NASA CR-242
Unclassified report

Descriptors: (*Fatigue(Mechanics), Spacecraft), (*Spacecraft, Fatigue(Mechanics)), (*Launch vehicles(Aerospace), Fatigue(Mechanics)).

N65-25546 Field 22C
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cocoa Beach, Fla. John F. Kennedy Space Center.
COMPUTATION OF SUB-SATELLITE POINTS FROM ORBITAL ELEMENTS,
by Richard H. Christ. Jun 65, 36p NASA-TN-D-2771
Unclassified report

Descriptors: (*Satellites(Artificial), Orbital trajectories), (*Programming(Computers), Orbital trajectories).

PB-167 489 Field 22D, 14B, 22B
CFSTI Prices: HC$3.00 MF$0.75

Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
SATELLITE TESTING PROCEDURES INCLUDING ENVIRONMENTAL CONDITIONS FOR PAYLOAD EQUIPMENT AND ASSEMBLED PAYLOADS. Revised ed.,
by Fred H. Esch. Oct 63, 66p
Rept. nos. TG-416-C, supersedes TG-416B
Contract NOw62 0604C
AD 424 460
Unclassified report

Descriptors: (*Satellites(Artificial), Test facilities), (*Payload, Test facilities), (*Test facilities, Satellites-(Artificial)), (*Astronautics, Test facilities), Test equipment, Environmental tests, Checkout procedures, Checkout equipment, Captive tests.

These tests are formulated specifically to establish the ability of the equipment to withstand, without performance degradation, storage, handling, transportation, pre-launching preparations, launching, orbital injection and sustained orbit.

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